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Snake to Monster: Conrad Gessner's *Schlangenbuch* and the Evolution of the Dragon in the Literature of Natural History

Abstract: Dragons, in the original sense of the word, are real animals. These iconic monsters of European folklore are the literary descendants of ordinary snakes that evolved through the centuries with much help from the discipline of natural history. Classical authors applied the term *dragon* to large snakes such as Aesculapian snakes and pythons. Over time, so many fabulous traits accrued in the descriptions of these animals that by the Renaissance dragon descriptions strained credulity, and eighteenth-century scientists dismissed dragons as mythical. Particularly important among dragon descriptions in the literature of natural history is that of Conrad Gessner in the snake volume of his animal encyclopedia *Historiae animalium*. Published in 1587, it incorporates a more comprehensive review of dragon lore and literature than any previous work. This makes it an important reference for describing the conceptual evolution of the dragon from an ordinary snake into a fabulous monster. The volume was first published in Latin, then in German in 1589 under the title *Schlangenbuch*. Here we use *Schlangenbuch*'s sources to trace the evolution of the dragon in the literature of natural history, with comments on the dragons of folktales, myths, and legends. We also present the first English translation of the dragon section of *Schlangenbuch*, annotated to identify Gessner's sources and their contributions to the conceptual evolution of the dragon. In addition we present, similarly annotated, the first English translation of the dragon section of Ibn Sīnā's *Canon of Medicine*, a source that Gessner repeatedly cited.

The evolution of the dragon in the Occidental literature of natural history provides an instructive look at how science, when combined

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with mythology and folklore, can produce a fantastic monster. The word *dragon* is derived from the Greek δράκων (*drakōn*) and its Latin cognate *draco*. The ancient Greeks and Romans applied the term to large, constricting snakes. Authors of ancient and medieval works on natural history typically listed the dragon among the various types of snakes. Over the centuries, errors in dragon descriptions accumulated by mistranslation, exaggeration, acceptance of folklore and myth as truth, and conflation of different animals that included snakes, marine fishes, and taxidermic hoaxes. By the Renaissance, the dragon had transformed into a fabulous creature (figure 1).

The role of natural history in contributing to this transformation has not previously been traced in detail. Here we present such a history, using Conrad Gessner's *Schlangenbuch* as a primary point of reference. Gessner (1516–1565), a Swiss physician, was one of several European naturalists of the Renaissance who wrote encyclopedic treatises in an attempt to compile all previous writings about the natural world (Findlen 1996). Gessner studied at Strasbourg, Basel, and Paris, and afterward taught Greek for three years. In 1541 he earned a doctorate in medicine from the University of Basel, and subsequently became a town physician and teacher of Aristotelian philosophy in Zurich. His 1545 work *Bibliotheca universalis* was an attempt to list all the books written since the time of ancient Greece. His five-volume encyclopedia of animals, *Historiae animalium*, remains a classic of natural history literature. It was an attempt to compile all that had ever been written about every animal species. Its fifth volume, on snakes, was published posthumously in 1587 in Latin. A German edition, titled *Schlangenbuch*, was published in 1589.[1] *Historiae animalium* was recognized in its own day as outstanding, and Gessner's immediate successors cited him as an authority (Topsell 1608; Aldrovandi 1640; Kircher 1678). Gessner's dragon illustrations (figure 2) were also reproduced in numerous subsequent books, including Edward Topsell's *Historie of Serpents* (1608).

We recently translated the dragon section (xxxv–xliii) of *Schlangenbuch* into English and have appended the English translation to this article as Appendix 1. Translation into a modern tongue is useful because the archaic German of *Schlangenbuch* makes it a difficult read even for German speakers. *Schlangenbuch* is useful in its own right as a treasure trove of European dragon folklore. However, during the annotating of the translation we discovered that *Schlangenbuch* could

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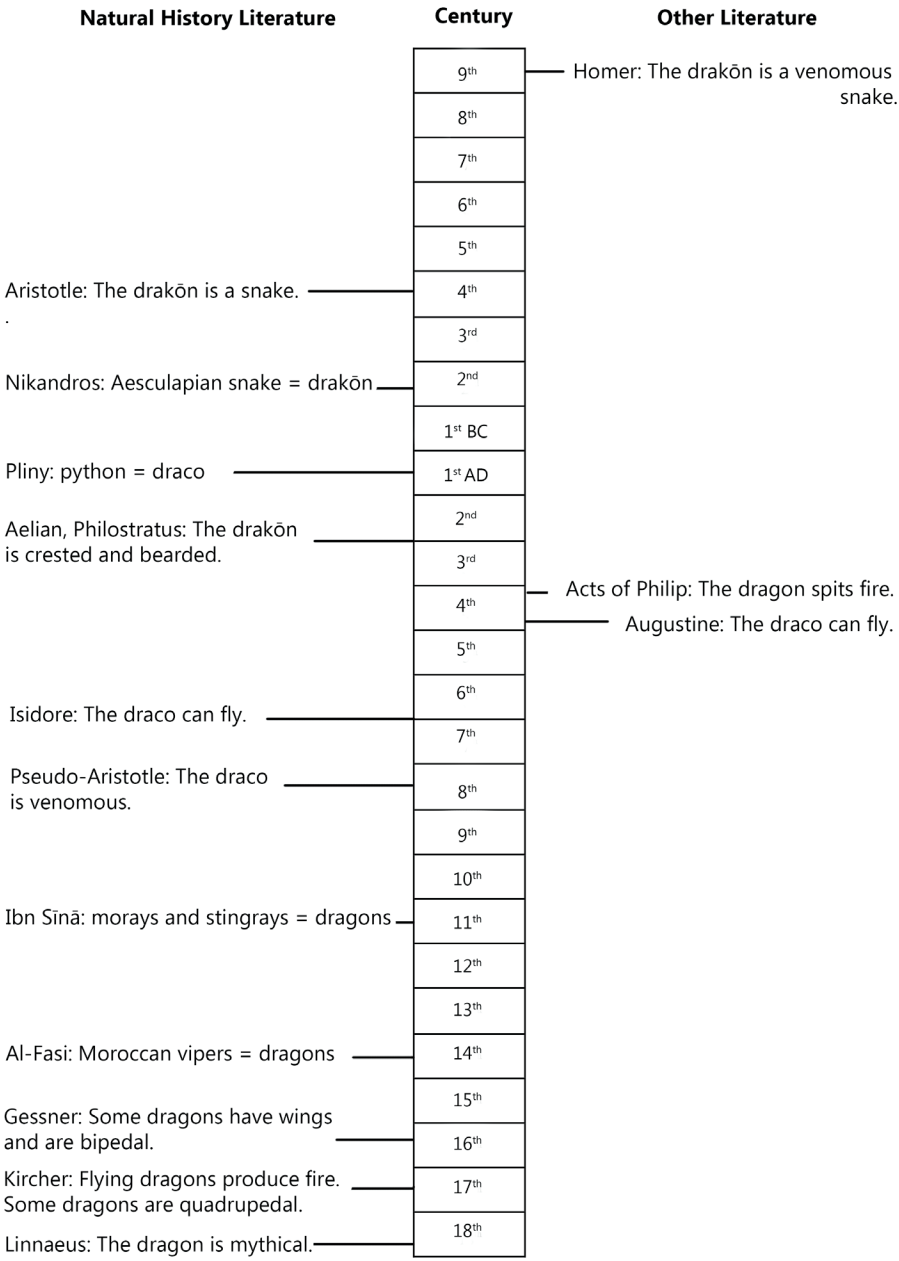

FIGURE 1
Natural history literature has both influenced and been influenced by changes in popular conceptions of the dragon through the centuries. Particularly important developments in the evolution of the dragon are summarized here.

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A B

FIGURE 2
The four dragon illustrations of *Schlangenbuch*. (A) Trio of dragons from the first page of the dragon section. (B) A winged dragon from the last page of the dragon section, based on an illustration from Belon (1557). Public domain images.

also be useful in another way: its sources, if put in chronological order, could serve as a guide to the conceptual evolution of the dragon in the literature of natural history. This is because Gessner outdid all previous authors in the comprehensiveness of his compilation of previously published dragon information, which included information from folklore and works of natural history. For the most part, *Schlangenbuch* and the Latin volume contain the same pieces of information, in the same order. However, *Schlangenbuch* includes some German folklore that the Latin volume omits, and the Latin volume includes some Greco-Roman dragon anecdotes that *Schlangenbuch* omits. Despite these omissions, *Schlangenbuch*'s coverage of previously published dragon information is comprehensive enough to reconstruct the conceptual evolution of the dragon with some confidence. The omitted anecdotes are not crucial to such a reconstruction because they do not describe aspects of dragon biology. Here, therefore, we present a history of the dragon's evolution, drawn mainly from the sources listed by Gessner in *Schlangenbuch*. We have omitted mention of the sources with material that is tangential to the history of this evolution. We refer anyone interested in those sources to our annotated translation of *Schlangenbuch* (Appendix 1) or to Gessner's Latin volume (1587), in which he cites his sources.

Appendix 2 of this article is an annotated English translation of the dragon section of Ibn Sīnā's *Canon of Medicine*. We have included this translation here because Gessner and previous authors made

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substantial use of the dragon section of the *Canon*, and because it has not previously been translated into English.

It is important to note that the Occidental (Western) dragon is not directly related to the Chinese dragon. The latter is a mythical creature believed to have its own independent origin and evolution in art and literature (Yang, Li, and Xu 1988). It seems to have no clear etymological, historical, mythological, or ancient iconographical connection to the Occidental dragon (de Visser 1913; Yang, Li, and Xu 1988; Carr 1990). Its having been given the name *dragon* in European languages is therefore a potential source of confusion. As shown below, Europeans originally conceived dragons as wingless and legless, but European artists began adding wings and limbs to dragons during the Middle Ages (Temple 1976; Alexander 1978), with the result that by the time of Marco Polo the Occidental dragon had, quite by accident, come to resemble the mythological creature that the Chinese had depicted for a millennium as a winged, scaly quadruped.

Classical Literature: The Dragon as a Constricting Snake

Schlangenbuch draws from numerous ancient Greek and Roman works. One of these is Homer's *Iliad*, written probably in the ninth century BC, the oldest known written work to use the word *drakōn*. The *drakōn* is mentioned in six passages of the *Iliad:* (2.301–320; 3.33–37; 6.181; 11.38–40; 12.195–229; 22.93–97) (Monro and Allen 1920).[2] In one of these (12.208), it is also called an ὄφις (*ophis*: snake). That Homer uses the term *drakōn* in reference to a snake is consistent with the other passages, which tell us that a drakōn is small enough to fit beneath an altar (2.310), is able to climb a tree (2.312–14), eats small birds (2.314), can be carried by an eagle (12.200–203), is something an eagle would bring to the nest to feed its young (12.222), and causes observers to tremble in the wilderness (3.33–35). Homer speaks of a silver decoration depicting a three-headed drakōn on an armor belt (11.38–40)—three headed-snakes are known from ancient Greek art and include depictions of the drakōn of the Hesperides (Ogden 2013). Homer also tells us that the hind end of the Chimera is a drakōn (6.181)—the Chimera is consistently depicted with a snake for a tail in classical art (Ogden 2013). Although Homer clearly uses the term *drakōn* for a snake, there is no indication that he means a specific

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kind of snake. As Bodson (1975) points out, in ancient Greek works the terms *drakōn* and *ophis* are almost interchangeable, but *drakōn* is used more commonly in religious or mythical contexts, whereas *ophis* is more common in ordinary contexts. The difference between the usage of the terms *serpent* and *snake* in English is similar.

The *drakōntes/dracones* of post-Homeric classical mythology are also snakes. One such creature guarded the golden fleece in Apollodorus's *Library* (1.9.16) (Frazer 1921). Similarly, another guarded the apples of the Hesperides and was slain by Herakles (*Library* 2.5.11). A third was slain by Kadmos (*Library* 3.4.1), and Apollo slew a fourth (Anonymous, *Hymn to Apollo*, line 300) (West 2003). In each case classical artists consistently depict the dragon as a snake (Ogden 2013; Senter 2013), and in many cases ancient authors call the animal a *dragōn* in one line and an *ophis* in another (*Iliad* 12.202 and 12.208; Hesiod, *Theogony* lines 323 and 825 [Evelyn-White 1914]; *Library* 2.5.11).

The earliest reference to the drakōn in natural history literature is a passing mention by Aristotle in *History of Animals*. As mentioned in *Schlangenbuch*, Aristotle (384–322 BC) says that the eagle is an enemy of the drakōn because the eagle eats snakes (*History of Animals* 9.2.3) (Cresswell 1902). As with Homer, Aristotle clearly uses the term *drakōn* for a snake, but there is no indication that he means a specific kind of snake.

The Greek physician and poet Nikandros (often Latinized as Nicander) of Kolophon (second century BC) is the earliest classical author to provide a description of the drakōn as a specific kind of snake. He provides this in *Theriaca*, a series of poems describing venomous animals and the effects of their bites and stings. The work includes entries on several snake species, including one that Nikandros describes as nonvenomous: the drakōn. He describes it as green and blue, with a yellow beard, and with a bite that hurts a man no more than the nibbling of a mouse. He adds that it eats birds and their eggs and is associated with Asklepios (*Theriaca* 446–57) (Gow and Scholfield 1953). The only Greek snake with a yellow chin is the Aesculapian snake, *Zamenis longissimus* (see figure 3A). It is variable in color, but one of its color forms that is found in Greece is olive-green anteriorly and dark bluish posteriorly (Kreiner 2007). It is nonvenomous, climbs trees, eats birds and mammals (Valakos et al. 2008), and is among the species of snake that scholars have suggested was the type of snake kept in the Greek temples of Asklepios (Ogden 2013). Among those species, it is the

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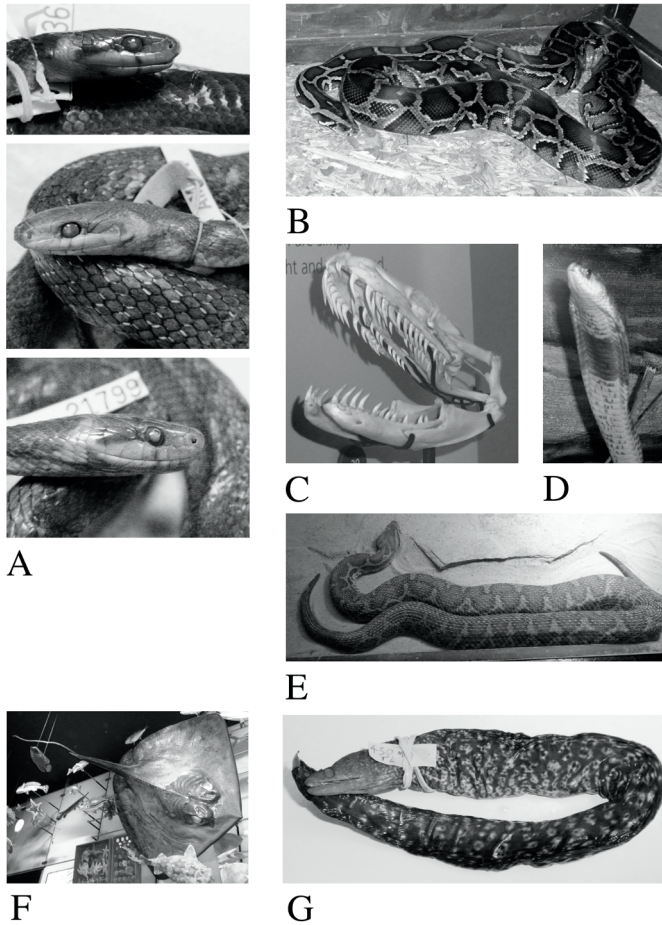

FIGURE 3
The dragon was a composite creature influenced by the traits of many animals: (A) *Zamenis longissimus*, the Aesculapian snake, displaying the yellow lips and chin—likely the "yellow beard" described by Nikandros—that are striking in dark (top), medium-tone (middle), and light-colored (bottom) specimens; (B) *Python molurus*, the Indian rock python, or Pliny's Indian dragon; (C) *Python sebae*, the African rock python, or Pliny's African dragon, showing the fang-sized anterior teeth (see Ibn Sīnā's description) as well as three rows of teeth (two upper, one lower) on each side, as is usual for a snake, and as is noted in Nikandros's dragon description; (D) *Naja haje*, the Egyptian cobra, with hood partially spread—the cobra's hood probably constitutes the "wings" of the "winged serpents" described by Herodotus; (E) *Macrovipera mauritanica*, the Moorish viper, or Al-Fasi's north African dragon; (F) a stingray (we have not identified the species), one of Ibn Sīnā's marine dragons; (G) and *Muraena helena*, the Mediterranean moray, another of Ibn Sīnā's marine dragons. All photographs by Phil Senter.

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only one with coloration that matches Nikandros's description. That Nikandros's *drakōn* is *Zamenis longissimus* is a reasonable conclusion.

Zamenis longissimus is a large constrictor, up to two meters in length (Valakos et al. 2008), and by the time of Pliny the Elder (AD 23–79) the name drakōn/draco was applied to other large constrictors. According to Pliny (Bostock 1855), the *draco* is a *serpens* (snake) (*Naturalis historia* 8.26) that is nonvenomous (29.21), kills by constriction (8.12), is found in India (8.15) and Africa (29.21), and can exceed twenty cubits in length (8.15). Ancient cubits varied from about eighteen inches to about twenty-one inches (Stone 2014), which makes twenty cubits between thirty and thirty-five feet (9.1 to 10.7 meters). Pliny's African and Indian dracones are pythons (figures 3B and 3C). The African rock python (*Python sebae*) and the Indian rock python (*Python molurus*) both grow to lengths beyond twenty feet (Villiers 1950; Das 2010). As Gessner notes, Pliny says that the draco kills elephants by constriction (*Naturalis historia* 8.15). That is unrealistic for even a large rock python but is an understandable exaggeration for a gigantic snake. Pliny does not claim that the draco is large enough to eat an elephant. Instead, after the dying elephant falls on it, the draco is crushed and dies as well (8.14, 8.15).

As noted in *Schlangenbuch*, Pliny adds one detail that is odd about the draco. He says that African dracones band together and sail across the ocean, using their raised heads as sails (*Naturalis historia* 8.13). It is possible that this bit of folklore is based on real African snakes that, while holding their necks erect, flatten and spread their necks like sails. Cobras (genus *Naja*) fit that description.

Identification of the term *drakōn/draco* with the python appears to have already occurred a century before Pliny, as illustrated through the large sizes of the dragons in three works cited in *Schlangenbuch*. In *Aeneid* (2.199–267), Vergil (70–19 BC) tells of mythical dracones that are large enough to kill Laocoön and his sons by constriction. In the mythical poem *Metamorphoses* (3.1–128) by Ovid (43 BC–AD 17/18), a *draco* strangles Cadmus's men to death (Magnus 1892). Strabo (64/63 BC–AD 24) notes in *Geography* (15.1.73) that drakōntes were imported from India during the reign of Augustus Caesar (27 BC–AD 14), who displayed one that was fifty cubits long in an open square in Rome (Meineke 1877). Although its cited size may be an exaggeration, this is possibly a reference to the Indian rock python.

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The size of the drakōn/draco is exaggerated in several subsequent classical bits of folklore that are mentioned in *Schlangenbuch*. We consider these accounts folklore and not natural history because they include numerous unbelievable elements and seem to be narratives created to illustrate moral points or glorify past leaders rather than for the purpose of biological description. In a second-century work, Cassius Maximus (Maximus of Tyre) says that certain Indians kept a dragon 500 feet long and fed it oxen (*Dissertation 38*) (Taylor 1804). Aelian (AD 175–235) says that an Indian raised and fed two drakōntes, one eighty cubits and the other 140 cubits long, which Alexander the Great desired to own (*On the Characteristics of Animals* 16.39); Aelian also notes (15.21) that in India Alexander encountered a seventy-cubit drakōn that the locals worshipped and kept in a cave (Scholfield 1958). The enormous sizes and Indian provenance suggest that pythons inspired these dragon stories. Aelian also relates the more believable account that two living, African drakōntes, one thirteen and the other fourteen cubits long, were brought to live in the temple of Asklepios in Alexandria during the reign (309–246 BC) of Ptolemy Philadelphus (16.39). In another folkloric account from Aelian, a drakōn protects a human friend by killing his enemies by constriction (6.63), which again suggests a python.

Characterization of the draco as a snake with characteristics of the python continues into the third century AD in the work of Solinus, another of Gessner's sources. According to Solinus, the draco is a large African snake that has a narrow throat and a forked, protruding tongue, and that kills by constriction (*De mirabilibus mundi* 15.11–14; 30.12) (Latin Library 2012). Both Solinus (25.11–14) and Aelian (*On the Characteristics of Animals* 2.21, 6.21) repeat Pliny's description of elephant constriction by the draco.

As shown above, by the first century AD it was common to apply the term *drakōn/draco* to the python. Even so, at least one area resisted such usage. As Gessner notes, Pausanias (c. AD 110–180) reports that the people of Epidauria, a region on the Peloponnese peninsula of southern Greece, applied the term *drakōn* only to a yellowish local snake species that was sacred to Asklepios and refused to use the term for the thirty-cubit snakes of India and Libya (*Description of Greece* 2.28.1) (Anonymous 1903). This passage from Pausanias illustrates that pythons were well known in the classical world, that the term *drakōn* was

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applied to them, and that it was also applied to *Zamenis longissimus*, which was sacred to Asklepios and is yellowish-olive in lighter-colored individuals.

Philostratus: Crests, Beards, and Mistranslations

Schlangenbuch quotes much from *Life of Apollonius of Tyana* 3.6–7 (Conybeare 1912)—compiled by the Greek sophist Philostratus (c. 171–c. 248)—which describes Indian drakōntes. Gessner considered Philostratus's account reliable, but actually it is fraught with problems. Philostratus claims that there are two kinds of dragons: a crestless lowland kind and a crested and bearded mountain kind. His description of attributes of the alleged mountain kind is largely a repetition of the Laocoön episode in Vergil's *Aeneid* (2.199–267). In addition to the problem of using a work of poetry as a source of information on natural history, Philostratus perpetrates significant mistranslations of Vergil's Latin into Greek and adds attributes derived from having taken figurative language in Nikandros's poetry in *Theriaca* too literally. Vergil's mythical dragons hold their necks high, swim fast across the sea, have red crests, have eyes that shine like fire, and their backs are folded into sinuous curves (*sinuatque immense volumine terga*). Philostratus repeats these attributes but mistranslates the "sea" as a "river," mistranslates "eyes that shine like fire" as "crests that shine like fire," and mistranslates "sinuously curved backs" as "serrated backs." Philostratus claims that drakōntes have overhanging eyebrows, a literalization of Nikandros's poetic statement that the dragon's eyes gleam beneath its brows (*Theriaca* 443). He states that drakōntes have bushy, golden-colored beards, which blends a literalization of Nikandros's yellow drakōn "beards" (line 444) with an inexplicable statement by Aelian (*On the Characteristics of Animals* 10.25) that the bushy beards of "human dog-faces" (probably baboons) resemble dragon beards. Baboons do not have chin tufts resembling beards, and the comparable animals that do have prominent chin tufts—mandrills (*Mandrillus sphinx*) and drills (*M. leucophaeus*)—are found only near the Congo delta (Kingdon 1997) and were unknown to the Greco-Roman world.

Philostratus's claim that mountain dragons are crested contradicts Pliny. In reference to a now-lost work by King Juba II of Mauretania (52/50 BC–AD 23), Pliny expresses surprise that Juba believes they

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have crests (*Naturalis historia* 8.13). Aelian says that the male dragon has a crest and beard, as does a rooster, in reference to a rooster's comb and wattle (*On the Characteristics of Animals* 11.26). In keeping with this, Philostratus says that the marsh dragons resemble female dragons in that they are uncrested (*Life of Apollonius of Tyana* 3.6).

Philostratus's claim that Indian dragons are red is based on mythical dragons in Greek myths. The red color of the two dragons that appear as omens in Homer's *Iliad* (3.301–320; 12.195–229) is related to their portending of bloody, war-related events. The red drakōn of Revelation 12:3 has similar portent. The red color of such dragons is probably unrelated to any natural snakes, for Europe has no solid red snakes—although the leopard snake (*Zamenis situla*) has reddish markings, and the orange-brown color morphs of the asp viper (*Vipera aspis*) and the adder (*Vipera berus*) could be described as reddish (Kreiner 2007).

To our knowledge, Gessner is the earliest natural history encyclopedist to include dragon information from Philostratus. There is no reference to Philostratus's descriptions in the dragon sections of the works of Solinus, Isidore of Seville (c. 560–636), Ibn Sīnā (980–1037), Vincent of Beauvais (1190–1264), or Albertus Magnus (c. 1200–1280).

Augustine: The Dragon Can Fly

In Greek myths recorded by Apollodorus (c. 180–after 120 BC) winged drakōntes pulled the chariots of Triptolemos and Medea (*Library* 1.5, 1.9) (Trzaskoma, Smith, Brunet 2004). Those dragons were exceptional because other dragons in classical writings and art lacked wings (Senter 2013). The Egyptian "flying serpents" of Herodotus and their Indian counterparts mentioned by Megasthenes (c. 350–290 BC) in *Indika* (now lost, quoted in Aelianus, *On the Characteristics of Animals* 16.41 [Scholfield 1958]) were not called dragons until Gessner's text. Because the ancient Greeks and Romans did not consider wings and flight to be the norm for dragons, Triptolemos's and Medea's winged dragons fall within the category of composite creatures such as Pegasus, the Chimera, satyrs, centaurs, and others from classical myth. The assertion by Augustine of Hippo (354–430) that dragons in general can fly (*On Psalm 148:* 7) (Coxe 1886) is therefore remarkable. According to Augustine, dragons are the largest animals. They

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live in subterranean caverns through which streams flow; they come out of the caverns, fly through the air, and disturb the air as they fly. This work by Augustine is an exposition on a psalm that mentions dragons and is not meant as a work of natural history. Nevertheless, his dragon passage is cited as authoritative in the dragon sections of subsequent natural history encyclopedias, including those by Isidore of Seville (*Etymologiae* 12.4) (Thayer 2013), Vincent of Beauvais (*Speculum naturae* 20.19) (Vincentius 1964), and Gessner.

The statements that the draco can fly and is larger than any other animal are unlikely to have been believed if familiarity with pythons and Aesculapian snakes was common. Indeed, due to the rise of Christianity—and later to imperial decree—the temples of Asklepios were closed by the end of the fourth century, and there are no records of importation of pythons into Europe after the first century AD. These circumstances allowed familiarity with the natural animals that had been called *draco* to decline among the general populace, which in turn allowed folkloric beliefs about them to flourish unchecked by observation.

The psalm on which Augustine expounds does not suggest flight in dragons, and it is not clear exactly what gave him the idea that dragons habitually flew. One possibility is the fight between the Archangel Michael and a dragon in Revelation 12, which takes place in the sky and suggests that dragons fly. A second possibility is the use of draco standards by Roman armies. Such standards, in use from the second through the fifth centuries, resembled elongated windsocks and would writhe and hiss as wind passed into their open mouths and through their fabric torsos (Lofmark 1995). The fact that these were held aloft may have contributed to the planting of the image of dragon flight in the public mind.

European artists began to portray dragons with wings in the eighth century (Alexander 1978), and winged dragons were standard fare in the illustrations of medieval bestiaries (White 1954; Morrison 2007). As dragon flight evolved in the popular imagination, a connection grew between dragons and fiery celestial phenomena. In his book *On Dragons* the Syrian monk John of Damascus (675/676–749) recorded that in his day some believed that lightning particularly targeted flying dragons, although he himself insisted that the drakōn was merely an ordinary, nonvenomous snake of very large size.[3] The targeting of dragons by lightning may be a corruption of Zeus's targeting of

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drakōn-legged Titans with thunderbolts in Greek myth. By the eighth century Europeans were calling meteors "dragons" (Brown 1980), and by the fourteenth century the Welsh used the same word (*draig*) for dragons and for sheet-lightning (Lofmark 1995). Fire production by flying dragons was well-established in European folklore by Gessner's time, although it was not until after Gessner that fire production in flying dragons entered the literature of natural history, as shown below.

Pseudo-Aristotle: The Dragon Is Venomous

Homer likens Hector to a drakōn that lies in wait for a man after eating noxious herbs (*Iliad* 22.91–94), apparently in reference to a folk explanation for how a snake becomes venomous. He therefore does not reserve the term *drakōn* for harmless snake species, and it is likely that in his day the term meant "serpent" generally. However, Nikandros and Pliny declared that the dragon is a nonvenomous snake species, and subsequent natural history authors such as Solinus and Isidore of Seville followed suit. This changed after the twelfth-century Latin translation of a geological work titled *De proprietatibus elementorum*, written under Aristotle's name by a ninth-century Arab (Vermij 1998), which many subsequent authors—including Gessner—believed was written by Aristotle. The work includes an apocryphal story in which King Philip of Macedon enlists Socrates's help to determine why a certain mountain road poisoned people to death. Socrates found that two dragons were holding their mouths open and poisoning the air. After they were killed, the road was safe. Dragon poison thus made its way into the literature of natural history. Subsequent authorities such as Vincent of Beauvais (*Speculum naturae* 29) (Vincentius 1964) and Albertus Magnus (*De animalibus* 25.27) (Kitchell et al. 1999) allude to the story, saying that dragons infect the air where they live, and Gessner repeats the story in *Schlangenbuch*.

According to Aristotle, a poisonous animal becomes more strongly poisonous if it eats other poisonous animals (*History of Animals* 8.28) (Cresswell 1902). Albertus Magnus, combining this idea with Homer's, says that all serpents eat poisonous flesh and herbs, and they become more strongly poisonous by eating more poisonous things (*De animalibus* 25.3) (Kitchell et al. 1999). He also states that the dragon's bite is bad because it eats poisonous things (*De animalibus* 25.26), immediately after insisting—contrary to his own subsequent statement

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but in keeping with previous authors such as Pliny and Solinus and Ibn Sīnā—that the dragon is nonpoisonous and its bite is bad not because of any poison but because it creates a serious wound (*De animalibus* 25.25). In *Schlangenbuch* Gessner resolves the contradiction by hypothesizing that the dragon is not usually poisonous, but in hot areas it becomes so.

In support of the idea that dragons are poisonous in hot areas, Gessner cites the travelogue of Al-Hasan ibn Muhammad al-Wazzan al-Fasi (c. 1494–c. 1554), whose work was published in Italian and other European languages under the pen name Leo Africanus. According to al-Fasi, the dragons of the Atlas mountains of Morocco are venomous and have a thick midsection but a narrow neck and tail (*History and Description of Africa* 3.9) (Pory 1600). This is an apt description of Moroccan vipers of the genus *Macrovipera* (figure 3E) and is the earliest use of the name *dragon* for a specific kind of venomous snake in the literature of natural history.

Gessner is the earliest natural history author to cite scripture in support of poisonous dragons: "Their wine is the poison of dragons" (Deuteronomy 32:33). However, Old Testament dragons are mistranslations. In the Septuagint, a Greek translation of the Old Testament that was made by the second century BC, the Hebrew word *tannîyn* is usually translated *drakōn* (Exodus 7:9–12; Deuteronomy 32:33; Job 7:12; Psalm 73/74:13, 90/91:13, 148:7; Isaiah 27:1, 51:9; Jeremiah 9:11, 14:6; 51:34–37; Lamentations 4:3; Ezekiel 29:3). *Tannîyn* can mean a jackal or a venomous, mythical sea monster. In the latter case a better translation would have been κῆτος (*kētos*), the Greek word for sea monsters and monstrous but real marine animals such as sharks, seals, and whales (Scholfield 1958). The Latin Vulgate usually uses *draco* for *tannîyn*. The Old Testament therefore provides support, via mistranslation, for the idea that the dragon is venomous.

In the popular imagination, dragons had already been venomous for centuries. The dracones that strangled Laocoön and his sons were venomous, according to Vergil (*Aeneid* 2.221) (Greenough 1900). A venomous dragon appears in the tenth-century manuscript of *Beowulf*, a poem that many authorities believe to have been composed in the eighth century and to contain stories from oral traditions earlier still (Swanton 1997). And in the intervening centuries, several stories of saints dispatching venomous dragons were composed (Godding 2000; Ogden 2013). But it was not until the twelfth-century translation of

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De proprietatibus elementorum that European natural history literature began to describe dragons as being venomous.

Ibn Sīnā: A New Description, and Marine Dragons

In the dragon section of *Canon of Medicine* by Abū 'Alī al-Ḥusayn ibn 'Abd Allāh ibn Sīnā (often Latinized as "Avicenna"), the description of the *tinnīn* (Arabic for *dragon*) is drawn mainly from Nikandros and Pliny. As we have seen, Nikandros and Pliny each describe a different species under the name "dragon," but Ibn Sīnā did not realize this. His description therefore blends information on both species. In addition, some of the information from Nikandros did not translate well. Paraphrasing Pliny, Ibn Sīnā says that the dragon is found in India and Africa and that the Indian dragons are larger and can reach thirty cubits. Paraphrasing—and misinterpreting—Nikandros, Ibn Sīnā says that the dragon has large eyebrows, a black (an alternate translation of Nikandros's "blue": κύανόν *kyanon*) and yellow face, three fangs (Nikandros mentioned three rows of teeth, as in figure 3C), a protrusion under the jaw (Nikandros's "beard"), and thick hair on the edges of the neck (possibly also derived from Nikandros's "beard") (A.U.B. Libraries 2007). Subsequent authors such as Vincent of Beauvais, Albertus Magnus, and Gessner would later repeat these details without realizing that they were misinterpretations of Nikandros's description.

Ibn Sīnā also adds a section on two marine animals that he says belong to the *tinnīn* category. One is the *smoraa*, which appears to be a cognate of σμύρος (*smyros*) and μύρος (*myros*), two names that Aristotle uses for the moray eel in *History of Animals* (Cresswell 1902). The other is the *trogorn*, which appears to be a cognate of τρυγών, *trygon*, Aristotle's term for the stingray (Cresswell 1902). Ibn Sīnā acknowledges that the terrestrial *tinnīn* and the *smoraa* are nonvenomous whereas the *trogorn* is not, and he lists a remedy for its venom.

Aristotle, Pliny, and Isidore had applied the term *drakōn/draco* to the venomous weever fishes of the family Trachinidae but did not classify these fishes within any category of serpents. Ibn Sīnā was the first to classify morays and stingrays as serpents and specifically dragons. Gessner, unaware that the smoraa and the trogorn were the moray and stingray, which he himself had classified with the fishes, added their traits to the list of dragon traits in *Schlangenbuch* and used the marine dragons as examples of dragons with poison.

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Taxidermic Hoaxes: The Dragon Gains Feet

European artists began to portray dragons with legs and feet as early as the eighth century (Alexander 1978), a practice that had become common by the tenth century (Temple 1976). Meanwhile, works on natural history continued to treat the dragon as a type of snake, legless like the others, and as late as the thirteenth century Albertus Magnus—who considered the dragon a type of serpent—stated categorically that "no genus of serpent whatsoever has feet" (*De animalibus* 2.83) (Kitchell et al. 1999). This changed in the sixteenth century, when the making of taxidermic hoaxes of bipedal, usually winged creatures, sold as "dragons," became common in the Mediterranean world (figure 4). *Schlangenbuch* cites records by Gerolamo Cardano (1501–76) and Pierre Belon (1517–64) of such specimens, and others continued to be made well into the seventeenth century (Dance 1976; Freedberg 2002; Senter and Wilkins 2013; Senter et al. 2013; Senter and Klein 2014). Some hoaxers made "dragons" to sell by carving skates and drying them in contorted configurations (figure 4A; see Dance 1976). Such fakes, nicknamed Jenny Hanivers, were exposed for what they were in Ulisse Aldrovandi's *Serpentum et draconum historiae* (1640). A plethora of other specimens, winged and two-legged composites made of snakes with other animal parts attached, were billed as flying serpents or dragons. Cardano (1551) recognized that the ones he saw in Paris were fake, while Belon (1557, 1558) thought the ones he saw in Egypt were genuine (figure 4C). Gessner accepted both sets of specimens as genuine and reproduced Belon's illustration of an Egyptian specimen (figure 2B).

Conrad Gessner and Afterward

Gessner's encyclopedia set the standard for subsequent dragon descriptions. It was the first to include dragon information from Aelian and Philostratus, as well as numerous other classical and later authors. Gessner used Philostratus's recognition of different kinds of dragons to resolve apparent contradictions in descriptions of dragons from previous literature (e.g., the dragon's color, whether or not it was crested, whether or not it had feet, and whether or not it had wings). Gessner was the first encyclopedist to apply the term *dragon* to the bipedal snakes manufactured by travelers' tales and taxidermists' hands. He was also the first to consider Herodotus's Egyptian flying snakes, of

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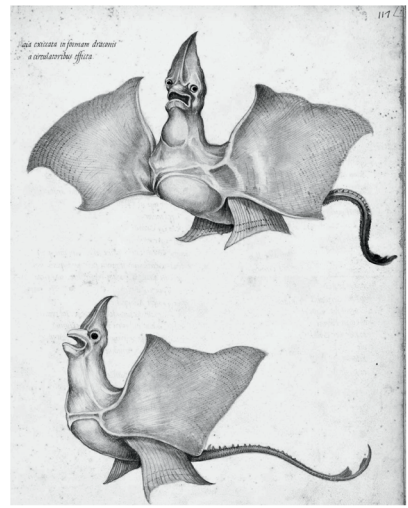

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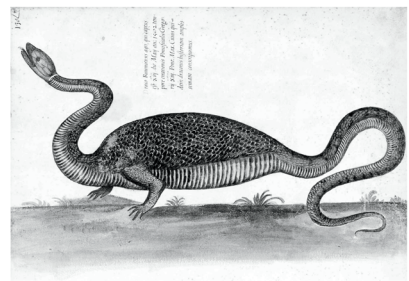

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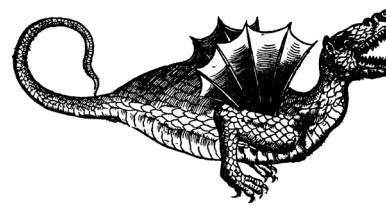

C

FIGURE 4
Fake dragons that were made during the Renaissance: (A) a Jenny Haniver (a mutilated and dried ray), sold as a "dragon," from Aldrovandi (1640); (B) a taxidermic composite made from a grass snake (*Natrix natrix*) with the torso of a fish and the forelimbs of a common toad (*Bufo bufo*) (Senter and Wilkins 2013), from Aldrovandi (1640); (C) and another taxidermic composite (note that the belly scales indicate the inclusion of a snake) displayed in Egypt, from Belon (1557). Public domain images.

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which more will be said below, to be a kind of dragon. Subsequent encyclopedists imitated him in all these respects (Topsell 1608; Aldrovandi 1640; Kircher 1678).

The Egyptian flying serpents deserve further comment. Herodotus, having heard of these creatures, traveled to a place near Buto, in the Nile Delta in "Arabia," and asked about winged snakes (*Histories* 2.75, 2.76, 3.107) (Hare 2010). As Anthon (1878) notes, among the ancient Greeks "Arabia" included both present-day Arabia and northeast Egypt up to the Nile. There he saw heaps of snake bones and heard that frankincense collectors used storax smoke to drive them out of frankincense trees. He was told that each spring the winged snakes fly toward Egypt but are killed by ibises before arrival. He does not claim to have seen any live, winged snakes but records that they have a μορφὴ (*morphē*: shape, form) like that of the ὕδρος (*hydros*: water snake of the genus *Natrix*), with featherless wings resembling those of a bat. Although the flight of the winged snakes may have been entirely apocryphal, the snakes themselves might have been real. When agitated, cobras spread the neck skin laterally from where shoulders would be (figure 3D), and the lateral spread of featherless skin invites comparison to bat wings. Cobras are found in Egypt and readily climb trees (Spawls and Branch 1995). Furthermore, Herodotus's choice of Buto as a place to ask about the snakes suggests cobras, because the city was sacred to the cobra goddess Uatchet, and cobras were worshipped there (Budge 1904).

Numerous classical authors mention Herodotus's winged Egyptian snakes (Senter 2013), and their legend was well known enough for the sixteenth-century Egyptian fakes that Belon saw to be believable and unsurprising. The existence of such creatures had not yet been seriously questioned when Gessner categorized them under the dragon umbrella, and his doing so validated numerous claims of sightings of flying dragons in Europe. From there it was but a short step to the validation of flying dragons that produced fire. Part of Gessner's legacy, then, is support for claims that such creatures had been seen, of which more will be said below.

Two major changes in the description of the dragon in natural history literature were introduced by the German Jesuit scholar Athanasius Kircher (1601/1602–1680) in his geological treatise *Mundi subterranei* (Kircher 1678). One is the claim that some dragons are quadrupedal, including one allegedly slain by the knight Deodato of Gozon in the

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fourteenth century. The second is the addition of fire production to the dragon's physiological repertoire. Fire production by dragons was already standard fare in European folklore but had not previously been accepted in the literature of natural history. The ancient Greeks had attributed fire-breathing to the Chimera's goat head and to the oxen guarding the Golden Fleece (Trzaskoma et al. 2004), and the tannîyn Leviathan breathes fire in the book of Job, but the earliest surviving written mention of fire-spitting by dragons is the fourth-century text *Acts of Philip* (Ogden 2013). In stories from subsequent centuries various saints encountered venom-spitting dragons, a few of which also spat fire (Ogden 2013), as did a number of dragons in the thirteenth-century *Legenda aurea* (de Voragine 1993), after which fire-breathing became standard in European dragon stories.

The idea of fire-breathing in dragons may be derived from a long-standing association of venom with fire, possibly because of the burning sensation that it produces. The venom-spitting cobra *Naja nubiae* inhabits Egypt (Baha el Din 2006), and Egyptian iconography from as early as the New Kingdom (dating from the sixteenth to eleventh century BC) shows cobras spitting arcs of fire drawn as a series of tiny, round dots (Budge 1904). These arcs of dots match those that denote flaming fuel that pours from braziers in Egyptian iconography (Wilkinson 1992), indicating a connection between venom and fire or burning in Egyptian thought. In the Old Testament, venomous snakes are called *sāraph*, which means "fiery" or "burning" (Benner 2005), suggesting a connection between venom or fire and burning in Hebrew thought.

Early (fourth century) written evidence of an association of dragons with fire (Ogden 2013) predates early (eighth century) written evidence of meteors being called dragons (Brown 1980). Association of dragons with meteors is therefore more likely the result than the cause of the association of dragons with fire. In any case, according to Albertus Magnus, his contemporaries actually did mistake meteors for fire-breathing dragons: because of "the smoke that spreads like mist at both ends in the shape of wings, the unskilled think this is a flying animal breathing fire" (*De animalibus* 25.28) (Kitchell et al. 1999). This apparently happened to one Christopher Schorer, who told Kircher that in 1619 he saw a dragon, shooting out sparks, fly across the night sky near Mount Pilatus in Switzerland (Kircher 1678). Kircher accepted this as evidence of fire-production in flying dragons and is, to our

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knowledge, the only author to seriously suggest in a work of natural history that dragons produce fire.

Gessner's work was so well-received that Topsell and Aldrovandi used his volumes as models for their own encyclopedias, although in their dragon entries both Topsell and Aldrovandi presented the information in a different sequence, omitted much that Gessner included, and included information that Gessner did not. For example, Topsell included a few new anecdotes about alleged dragon sightings (Topsell 1608). Aldrovandi included a unique, lengthy section on a wingless, bipedal dragon hoax (figure 4B) that he described as a real animal, shrewdly peppering the description with clues that he knew that it was a taxidermic composite (Senter et al. 2013).

Encyclopedists through the sixteenth century accepted most previous written accounts as genuine. In contrast, their seventeenth- and eighteenth-century successors typically replaced uncritical compilation of information with insistence on empirical confirmation by independent observation. Members of the Lyncean Academy, the students of Linnaeus, and others of similar mindset questioned the ancient authorities and corrected many errors that Gessner and other previous encyclopedists repeated. The new scientists dismissed the dragon as altogether mythical (Linnaeus 1758; de Lacépède 1808). The existence of a fire-breathing, venomous, crested, bearded, flying snake that kills elephants strained credulity, especially after the exposure of taxidermic dragon hoaxes (Dance 1976). Nevertheless, the original dragons (Aesculapian snakes and pythons), as well as animals (moray eels, stingrays, vipers, and cobras) and phenomena (e.g., meteors) that later bore the name dragon, certainly exist. Before now, no one has traced the role of natural history in fusing these entities into the monster that, together, they became. We are therefore pleased to be able to contribute this history of the making of a fabulous beast via centuries of conflation, elaboration, fabrication, and often mistranslation, in the literature of natural history.

Appendix 1: Annotated English Translation of the Dragon Section of Conrad Gessner's *Schlangenbuch*

Uta Mattox translated the German of Gessner's *Schlangenbuch* into English. Phil Senter provided minor editing. Eid E. Haddad provided insight into the dragon section of Ibn Sīnā's *Canon of Medicine* for the

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endnotes of this translation. For places in which the text of *Schlangenbuch* was unclear or included old German words that were unfamiliar to us, we are grateful to two anonymous reviewers who contributed translations of several words and other useful suggestions.

Below, notes in square brackets are explanations by us. Italicized words or phrases not followed by brackets indicate words or phrases that are set off by a change in font in *Schlangenbuch*, somewhat as one uses italic font today. Here, notes enclosed in rounded parentheses are from *Schlangenbuch* itself, in which they are also enclosed in rounded parentheses.

About Dragons

Δράκων	Trach, Track
Draco	Lindwurm

About Their Size and Where to Find Them

The Greek word dragon[4] refers to the animal's good eyesight,[5] often also attributed to snakes in general. One should call Dragons especially those snakes with bodies so big and heavy that they surpass all others in size, hence the Greek saying: unless snakes swallow snakes and eat them they will not turn into dragons. They are therefore to snakes as the large whale fish [whales] are to other fish.

Augustine says that there are no animals larger than dragons to be found on earth.[6] In Italian they are called *Drago* and *Dragone* and in French *un dragon*. Avicenna and Albertus[7] count under this species *Albedelimon*, *Alhatraf* and *Haudern*.

Aelianus writes that the land of the Moors has dragons thirty paces long. Supposedly they do not have a separate name among the Moors but are all called Elephant Killers, and they reach an old age.[8]

At the time of Alexander the Great, an Indian raised and fed two large dragons, one of which was forty-six and the other eighty cubits long, that Alexander the Great desired due to their remarkable size.[9]

Egyptians claim (says Aelianus) that when king Philadelphus reigned, two live dragons (one fourteen and the other thirteen cubits long) from Ethiopia were brought to Alexandria. So also at the time of Energetes three were taken there that measured seven and nine cubits in length; the third was, at great cost and energy, raised and fed in the temple of the idol Aesculapius.[10]

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The island of Chios[11] at one time supposedly had an immensely large dragon in a thick shady forest whose hissing[12] scared the inhabitants there. And though neither the farmers nor the shepherds could see its size they still could guess, based on the terrible hissing, that it must have been a scarily large animal. At first they had to estimate its size, but then they accomplished the miracle [size determination]. This is because when a strong wind blew and the forest caught fire as a result of the trees being thrown against each other, the fire surrounded the dragon on all sides so that it could not run away and therefore burned and expired. After the whole forest burned down the people of Chios found its head and bones, which were remarkably large and ugly to look at, indicating clearly how terrible and frightful it must have been.[13]

Aelianus[14] also reports that Alexander the Great saw and met many weird animals in India. Among them he also found a dragon there; due to the requests by the Indians, for whom it was holy, he spared it. They say it was seventy cubits long. When it heard Alexander come closer it hissed[15] so cruelly that all people were terribly scared by it. It did not fully come out of the cave but only stuck its head out. Its eyes reportedly were as big as large shields.

Maximus of Tyre writes that around the same time a dragon five hundred feet long was kept by Indians and was fed oxen.[16]

Ethiopia breeds many dragons, especially in the south, due to the nearness to the sun and great heat; [17] often they are twenty cubits long.[18] Additionally, they also can be found in India, Nubia, Libya, and other similarly hot countries in large numbers, and these can be up to fifteen paces long with a girth no less than that of a wooden beam,[19] yet the Indian ones are bigger and more monstrous than those grown in the land of the Moors.[20]

In the wasteland where formerly the city of Babel stood, many enormous dragons are supposed to have made their home.[21]

Leo Africanus writes that the holes or caves of the Atlas Mountains are filled with large dragons that cannot move very well due to the thickness and weight of the stomach (because the stomach or the middle is large and fat, the head and the tail small and thin).[22]

Mr. Johann Stumpff[23] reports in his Chronicle that although Pliny wrote that the dragons in India and the land of the Moors were tamed, we have some of them living in our Alp mountains. Even though the Alps receive a lot of snow, still in many areas they have rock faces and

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caves toward noon [south], facing the gleam of the sun. There the dragons at home, often in the caves of the rocks, lie in the heat of the sun to warm themselves thus.

Emperor Octavianus had a dragon that was fifty cubits long that he would display on occasion to the people in Rome in an open square.[24]

Many other credible historic writers, whom I will not all mention, testify to their large size. The smallest had a length of four or five cubits.[25]

Differences among Dragons

They are primarily divided into two species. Those of one kind stay in the mountains and mountainous areas, are large, speedy, fast, and have a comb;[26] the others live in bogs and swamps, are slow, lazy, and comfortable, and no comb grows for them. Philostratus writes: "In India there are many wondersome dragons; yes, all mountains, swamps and valleys are full. No hill can be found there that does not produce such pests. But those that live in the swamps are so lazy and slow that they barely lift their heads, and they reach a length of thirty cubits. They are blackish on their backs and not as scaly as the others."[27]

Homer writes about a dragon that he says has a red back;[28] the other poets say it has a comb. But those that stay in the swamps grow no comb. In contrast, in the mountain dragons the comb appears while they are still young, and as they get older it grows so big that it will hang down on one side. The same dragons live in caves at the bottom of the mountains; some higher up come down to the plains and wait for food and tend also to scavenge it from dragons who stay in the waters and take it away. Because they are much larger and certainly faster than any river, they therefore will not be robbed in water or on land. Those that are fire colored are decorated with a beard or dewlap in addition to the comb, lift their heads high, and their scales gleam like silver. Their size is like that of a pig, but they are thinner and more flexible and have a strong snout.[29] Those that live on top and bottom of the mountains vary in size, color, and shape.[30]

Depending on their habitat no small difference between them is noticeable.

Many of them have wings, and many do not. Augustine says that a dragon often lies in its cave, but as soon as it feels the humidity of the

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air it will come out and with the help of its wings becomes airborne and flies off with great speed.[31]

Many slink along with their chest or stomach on the ground on legs. Many have legs. Paulus Jovius says that in the kingdom of the Georgians (in the east) one can find flying snakes that have goose feet and creep foot by foot.[32]

They also differ in color. Many are black, many red, many the color of ash, many yellow. Pausanias indicates that the type of dragon that is yellow is harmless, may be tamed, may be made housebroken, and may be dedicated to Aesculapius and made holy. The land of the Epidaurians alone is supposed to birth them; because of that they boast of their dragons that they live only in their country. The others born in India and Africa they refuse to call dragons.[33]

On the other hand, Lucian reports that the land of Macedonia has remarkably large snakes (which they called Pellae) that were quite tame and harmless and had been raised by humans. Yes, they are also supposed to have been lying with children and been slow to be provoked to anger.[34]

About Their Form

Dragons are mostly colored black and have a green chest, beautiful to look at; some have scales on their whole body and large eyes. Their eyebrows protrude far and cover their eyes. On the chin they have a protrusion that is similar to a beard.[35]

Solinus and others say that dragons have a small mouth, which they can't open wide as they bite someone; instead it is like a narrow tube or hole through which they pull in air and stick out the tongue. Their tails are more powerful than their teeth; they harm and restrain with the tail and then bite.[36] On the other hand, Aetius[37] and Avicenna[38] write that they have a large, wide mouth and long canine teeth like wild pigs. To explain these two opinions you have to know that there are two different kinds of dragons. One is the Epidaurian kind, which Nicander[39] thinks has a small mouth like a tube, as mentioned. The others, however, as in India, the land of the Moors, and born in other similar places, have a large mouth, so large that they swallow birds and other animals whole.[40] Their tongues are split.[41] The teeth are strong and large, sharp and offset like a saw that is sharpened well.[42] While Pliny denies that such dragons [i.e. with comb and beard] have ever

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been seen,[43] many other trustworthy writers say that the males, especially of mountain dragons, are decorated with a comb and beard.[44]

About Their Nature and Needs

They have sharp eyesight and good hearing and rarely sleep, and because of that, poets call them guardians of treasures, who guard the treasures so nobody else can approach them.

The air where a dragon lives is polluted by its hissing[45] and poisonous steam.[46] It lives on a variety of dishes: apples, herbs, eggs, various animals and birds.[47] It may live for a long while without food, and especially when it becomes old and has reached its natural size it will go for a long time without food. But when it finds food and starts [to eat] it will not be sated for a long time.[48] In Phrygia one can see dragons ten feet long (as Aelianus indicates) that stay by the Rhyndacus River all day and eat outside their caves, support themselves on their tail, lift up their entire body, straighten out their neck, and thus wait with their mouth wide open so that they can attract birds that fly over them with their breath and swallow them, no matter how fast the birds are. Such they do until the sun goes down; after that they hide and lie in wait for the animals that are being herded back, to rob and damage the herd, and often they also take the shepherds' lives.[49]

In the land of the Moors four or five dragons will band together and swim with erect heads (which serve them in place of sails) through the ocean and other bodies of water,[50] and those that have wings become airborne to search for food.[51] Otherwise they stay near the water or under rocks, in crevices and caves, due to their inner heat as well as the sun's heat; in such countries toward the east (because one finds them most in hot areas) they are rather large and miserable.[52]

With regard to their birth the Africans generally say the eagle joins or mixes with the female wolf, but she does not give birth; rather, she is split in two, and thus is created the dragon with the beak and wings like those of an eagle and the tail and legs like those of a wolf, with a spotted snake skin.[53] Because this birth is unbelievable, however, it is therefore quite plausible to think that not only is the dragon not born that way but has also never been seen in this shape anywhere.

When dragons eat a lot of apples, and due to that become disagreeable, they tend to cure it with the juice of wild lettuce.[54] They also sharpen and improve their eyesight with fennel.[55]

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Aelianus tells numerous stories in which those who were loved by dragons were rescued from grave dangers. Above we mentioned the shepherd named Alena. To him a large dragon sneaked up, showed itself friendly, licked his face, and brought him several times a share of its prey.[56]

Similarly, large dragons have learned to love beautiful maidens, as shown elsewhere.

Among the Jews in the time of Herod a dragon loved a maiden very much, and even though it showed itself very friendly and loving toward her, she still was scared of it and changed her shelter in the hope that the dragon would forget her if she stayed for a month. However, its love burned more over time and increased in her absence in such a way that it could not find rest anywhere but stayed day and night where the maiden's home was previously. And because it could not find her, the dragon was sad and distraught, just as a lover who misses his beloved. As the maiden returned home again after some time, from that hour on the dragon acted a bit like a stranger toward her, but with loving gestures even though it had been disdained, wrapped itself around her body and hit her hard around her legs.[57]

In Arcadia (which is in Greece) a young dragon was raised once with a child, but when the young man grew up and came of age the dragon also increased vastly in size. His friends were driven to discuss what to do about it. Finally they agreed that because the dragon in such a short amount of time had grown so incredibly large and fearsome, but both of them still felt a lot of love toward each other, they should carry the dragon along with the young man far away into the wilderness while they were asleep. The young man, however, returned back home after all of that and left the dragon in the wilderness. It now stayed there. Perhaps it was more agreeable than the old lodging. In the woods it ate herbs and what it found. When the more mature young man was to travel through the approximate area in which the dragon lived, several murderers attacked him, beat him, and hurt him so much that he started to cry for help. The dragon heard (because they can hear by nature), recognized his young man's voice, became very angry, and hissed[58] so loudly that the villains were scared by it and trembled, and one fled one way and another the other way, and those that the dragon was able to capture and restrain it strangled, and thus rescued its friend from danger. After this deed it returned to its home to which it had been banned and did not blame the young

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man that he left it in the wilderness and did not desert its old friend in this case of need as humans often tend to do. A similar story is shared by Aelianus in the thirteenth book.[59]

Aelianus writes that King Laocoön in Macedonia begat a son named Pindus. He was a courageous virtuous hero with great beauty. Laocoön had more sons after Pindus, none of whom compared to Pindus with regard to beauty and virtues. They competed with him and were jealous of him and therefore schemed how to subdue him and to take his life. Pindus noticed the hatred and schemes of his brothers. He left the kingdom that he owned, and that he had inherited from his father. But he did not roam [apparently this means that he found a place that he liked and stayed there]. Since he had an affinity and pleasure for hunting, he went instead to hunt. One time when he pursued deer and chased them in full speed on his horse, he got so far away from the other hunters that he could no longer see them, but the deer disappeared into a deep cave to get away from the hunters and to save their [the deer's] lives. Pindus got off his horse, tied it to a tree, and searched for the cave. As he searched for it he heard a voice warning him not to touch the deer. The voice frightened him. Puzzled, as he could not see anyone, he mounted his horse and rode away. The following day he returned to the same spot but did not crawl into the cave because he remembered the voice warning him the day before. He started to doubt what kind of voice it could have been and looked around to see if there were not shepherds or hunters there. Meanwhile, a monstrous dragon sneaked up on him, lifted its chest and head (so the height was that of a human) and rushed toward him. Even though Pindus was very surprised by it, he did not flee, but after recovering a little bit he calmed the dragon by offering birds and other prey from his hunt and threw those in front of it to save himself. The dragon was impressed by the gifts and mellowed, so it did not attack. The friendliness of this pleased Pindus so much that from then on, as thanks and reward, he presented all the results of his hunts. However, his generosity was well rewarded. Because everything he did was charmed and went well, no deer he hunted got away, so he was praised in all the country as to how he managed and hunted the wild animals. In addition, due to his size and courage he was feared by many. The women fell for his good looks, and love for him started to burn. They rode to him on the hunt. Others who could not come there wished that he would know their bodies and sleep with them. All

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in all he was loved by everyone, valued, and pleasing to everyone. Only his brothers hated him and schemed to take his life. They attacked him one time when he was hunting by himself and led him to a spot by the river where he neither could receive aid nor flee. They hit him and murdered him. But when the dragon, who was lying nearby, heard him cry, it hurried there and reached the villains with its tail and hit them to death, and it did not move from the dead body until his friends who were searching for him found him. When the dragon saw that they mourned his death and cried but did not dare come close due to their fear of it and could not bury him, it left so he could be buried.[60]

The eagle is a steady enemy to the dragon, because it eats snakes.[61] Aelianus says the dragon does not fight the eagle but instead, as soon it hears the sound of the wings, hides in its cave.[62] It has a special liking of the eagle's eggs. That is why it hunts the eagle and attacks it: it coils itself with many coils around its wings, until both fall to the ground together. This is described by Nicander. He says:

> When the dragon in the green forest
> Attacks the young in the nest,
> The eagle will pursue it.
> To fight with it is stressful to him.
> The dragon does not flee; it plans with tricks
> How to take its prey,
> The rabbit and young fowl,
> Tears into them with its claws.
> The eagle bites as well
> To become the winner;
> It grabs the prey with its claws
> And thrashes them in the air.
> Then the dragon's railings no longer help,
> Despite throwing itself from side to side.
> From the fighting it must pause
> And see how it disappears from the scene.[63]

Gyllius[64] writes that when the dragon comes out of the bushes it will easily take a sheep or rabbit from the eagle. Meanwhile, often, however, because they fight with each other, the rabbit often can escape.

Homer writes as well how they catch and damage each other. He says:

> The Trojans kept back
> An eagle flying above them,

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Which was holding in its claws
A dragon that was coiling quickly
And fought even though it was wounded.
Once it could tear itself away
It bit the eagle in the chest
So that it had to let go,
As the bite hurt so much
That it could not hold on any longer.[65]

The dragons also have an ongoing fight with the elephants. Ethiopia has dragons [as illustrated in figure 2A] thirty paces long that have no specific name except that they are solely called elephant killers. When a dragon is aware that the elephants are grazing many trees bare, it pays attention to that and then climbs that same tree, covers its tail with leaves and branches, and lets its front part hang down like a rope. Now when the elephant approaches to eat the uppermost shoots it suddenly jumps into its eyes, tears out the eyes, and twists and entangles it such that it has to stay in place. Often they lie next to the paths the elephants commonly travel and, hidden, wait for them, letting the first ones pass and attacking the last one so that those in front may not be able to help it. They tie its legs with their tails so it can't go any further and strangle it.[66] Pliny says they are so big that they can wind around the elephant's whole body and strangle it. The dragon, however, at times will also be crushed and killed by the elephant. So when they attack an elephant and are wound around its body, it will rub against a rock or a tree and crush and grind the dragon, but to preempt that the dragon uses another trick, winding itself around its legs so it can no longer move forward. At times the dragon is also supposed to jump on an elephant, bite it, and suck its blood until finally it is so weak that it will fall down, and as it falls it hits the dragon and one kills the other, and so both die. From such enmity one can see how those that are the same in nature search for and find each other. Many say there is no other reason for the dragon to desire the elephant's blood so much than that its own blood is cold, and that the dragon aims to cool its own heat. It hides therefore in the river to wait until the elephant comes to drink. So then it comes, attacks at one ear (since the elephant's ear is not protected by its beak [trunk]) and sucks blood from it. The elephant weakly will fall down. The dragon, however, will suffocate from all that blood and die as well.[67]

The dragon shows also enmity toward the lion.[68]

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The leopard is hated by all animals, and almost all animals will flee from it, including the dragon.[69]

How and for What Reasons One Catches Dragons

The mountain dragons are caught by the Indians this way. In front of their caves they spread a scarlet red cloth onto which golden letters are woven. The words are supposed to have the power to magically put dragons to sleep. Besides this the magicians use many words and are so effective that the dragon will lie down on the cloth and fall asleep. When that has occurred, they will cut off its head with an axe. At times, though, they lack their magic and get swallowed by the dragon, including their axe, but they endanger themselves thus and take their prey in order to get the small stones that are supposed to be inside the dragon's head and capture those. They are splendidly fire-coloured and beautiful to look at and hold strong powers. It is said that Gyes (whom Cicero remembers) carried one of those stones crafted into his ring.[70] Varro writes: "One takes or uses three things from a dead dragon: the skin, the teeth, and the eyes that are the color of fire."[71] Their flesh is the color of glass, and cools things. Therefore the Moors, who live in hot countries, consider it delicious food. For that reason one can find traders who attract them, raise them or tame them, and then take them to the land of the Moors.[72]

Several Types of Medication Which Are Used and Are from Dragons

The dragon's fat, dried in the sun, heals growing wounds or sores.[73] A bone from the spine calms toothaches.[74] Whoever receives a dragon head is supposed to be safe from runny eyes.[75] This fat, mixed with old oil and honey, improves and sharpens weak eyesight. If you boil its [a dragon's] tongue with gall juice and wine and smear yourself with it, it helps those who are suffering from incubi.[76]

One takes many other things from the dragon, which are not necessary to recount, to use in magic potions and to accomplish other idolatries.

Doctors in many places write about dragon blood, but it is not well established what it is. Pliny stated (erring tremendously) that it was the blood lost in a fight between the dragon and the elephant.[77] Others say that it is a rubber or resin flowing from a tree in Africa. Serapion

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thinks this blood is the sap of some herb. Many call the blood stone by that name; others name it differently.[78]

But to keep it short I will let rest my opinions and as explanation only share something from the letters of Johannes Lang.[79] He reports that in Venice, rubber red in color and the size of a hazelnut was shown by Geraldo, who told him: "Look, this rubber is the real dragon blood and is from the new island named Porto Santo and was brought here." It is useful, as one mixes medications in the eye and amazingly the blood sprinkled into wounds, also called Indian cinnabar. But it is a different part of the plant than the mimium or mountain cinnabar, dug in silver mines and formed with hammers and used as color for painters. Pliny[80] stated that dragon blood was collected from dragons after their fight, and indicated also that this Indian cinnabar with the mimium, which is mountain cinnabar (which is poison due to the quicksilver it contains), should not be regarded as a plant. For the very reason that this *sanguis draconis* [dragon blood] is found to be a useful and healing Indian cinnabar, it is my opinion that neither mountain cinnabar nor Dragon Sweat should be called Indian cinnabar because the true dragon blood, *sanguis draconis*, is nothing but a sap that blooms like red dripping out of trees in India and the Atlantic Islands, which neither Dioscorides,[81] Pliny,[82] nor Theophrastus[83] recognized properly, since they did not mention anywhere that Indian cinnabar was a sap or rubber. Doctor Lang's opinion is confirmed by Arrian[84] and Aloisius, a Portuguese ship owner, who both testify that the inhabitants of the island Porto Santo cut and injure at specific times during the year the bark of this tree, from which in the following year a lot of sap or rubber runs. They boil the sap in kettles until it becomes thick and red like blood, which is the reason it is called dragon blood. But one should be concerned that the *sanguis draconis* that is sold in our areas in pharmacies is nothing but goat blood with mountain cinnabar or service berries (with pieces of which it has been adulterated by old people and therefore is of more use to painters than to doctors), boiled thick.

About the Dragon's Bite and Poison

Dragons have little or no poison at all, and because of that are considered among the snakes that are more detrimental due to wounds [bite wounds] than their poison. Ardoinus,[85] though, claims that they poison

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and pollute the air of the places where they live. Also, they are ascribed poison in the fifth book of Moses in the thirty-second chapter.[86]

Therefore, it should be noted that dragons by their kind and nature are not poisonous, but in some countries at times poisonous dragons may be found, just as other snakes in cold countries are not as dangerous as in Africa and other similar hot areas. Therefore, says Lucanus:

> You dragons that in the whole country
> Until now have been known to be harmless
> Are in Africa, however,
> Poisonous and harmful everywhere.[87]

Leo Africanus writes that the Atlas dragons are so poisonous that nobody bitten or touched by them can be kept alive.[88] When they pursue humans or animals and are rebellious they tend to first eat poisonous herbs and roots.[89] Otherwise they will do the most harm with their tails rather than with their teeth, and whom they catch with their tail they will strangle. Their bite is not large and painful because their mouths are small, and they fight not much with biting but show their strength primarily in their tail[90] as is understood for the Epidauric Dragon. And then there are others with large, curved teeth, same as wild pigs have. And while those are not very poisonous their bite is still harmful; they crush and bite what they can into small pieces.[91]

The bite of the male is more harmful than that of the female, but both should be healed as open wounds.[92] Therefore it is necessary to guard against the poison and its effects; instead tend to it as if it is another harmless bite.

Pliny writes that grass seed has been well proven to be useful against a dragon bite.[93] The sea-barbel or redbeard [red mullet] placed on top of the wound and also eaten withstands the poison of the scorpion and bite of the dragon.[94] It is also said that if one tops a bite with the skinned head of the dog or dragon that did the biting, along with a little castoreum, this would restore health.[95] As mentioned above, Avicenna and Albertus count three kinds of the species of dragons, which are *Albedestmon*, *Alhatraf* and *Haudem*.[96] Their signs of poison and healing are given here according to Avicenna. The bite of *Albedesimon* (he states) is dangerous and worrisome because it tears the flesh badly due to its sharp teeth and therefore should be treated as a bad

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and dangerous wound.[97] The bite of the other two kinds is followed by severe pain, and the limbs and the whole body turn cold and become stiff from it, so the wounded will die soon. This bite can be handled as other bites from cold poison and withstood. Many say to drip tepid vinegar on the bite, cover it with leaves of the laurel tree, and apply oil in which costmary and pellitory root are applied. Similarly acts the oil made from sea onions and nettles or prepared from others presumed to be of similar power. In addition, the invalid may be given to drink juice of leaves from the laurel tree with vinegar or myrrh peppers and shoots each mixed equally well and the amount of four *scrupel* [a measure of weight] administered in wine.[98]

Several Stories, Fables, and Sayings Based on Dragons

Here many rivers, mountains, towns, islands, herbs, fish, men, and such, that have been named after dragons, could be introduced. However, since learning about that will not serve the knowledge of the nature and traits of the above-mentioned dragons, most of it will be skipped to make it shorter.

The holy scripture calls the devil a dragon in the Book of Job, as well as in the twelfth chapter of the Revelation of John: And there appeared (says Saint John) a great wonder in the heavens; and behold a great red dragon, having seven heads and ten horns, and seven crowns upon his heads. And its tail drew a third part of the stars of heaven, and did cast them to the earth; and after the angel Michael fought against it, the great dragon was cast out, that old serpent called the Devil, and Satan, which deceiveth the whole world. And in chapter 16 it says: And I saw three unclean spirits like frogs come out of the mouth of the dragon, and out of the mouth of the beast, and out of the mouth of the false prophet, etc. In addition, the dragon is mentioned often in the holy Biblical scripture. Malachi[99] in the first chapter. Jeremiah in the fifty-first chapter. In the thirteenth chapter of Isaiah God says the owls shall cry in desolate houses, and dragons in pleasant palaces. In Chapter 34 the Lord says that in Idumea will grow nettles and brambles in the fortresses thereof; and it shall be a habitation of dragons and a court for ostriches.[100] David says in Psalm 44: Thou hast sore broken us in the place of dragons, and covered us with the shadow of death. The scripture also describes their pitiful howling and complaints in chap-

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ter 1 of Micah. I will make a wailing like the dragons, and a mourning as the young ostriches. Therefore says Job, lamenting his misery and loneliness, now I am a brother to dragons, and a companion of young ostriches. In Jeremiah chapter 14, speaks the Lord: And the wild asses did stand on the high places, they snuffed up the wind like dragons; that means they will have nothing to satiate their hunger and therefore die, due to a lack of food and drink, and find their end. Dragons and other pests might well experience such hunger, when they are in the fresh air, because they attract cold air due to their heated state in order to diminish their inner heat and to cool down.

There is an herb *drachenwurz* [dragonwort] named for dragons. There are (as Dioscorides says) two kinds, small and large. The large has a stem two cubits tall that is straight, smooth, and quite thick like a stick and sprinkled with brown-black marks like a dragon; it has leaves like *mengelwurtz* [sorrel, dock] wound into each other.[101] Pliny describes more variations; the fourth kind that he reports found in Catalonia near Spain agrees with the one described now. The third has leaves (so he says) larger than the Cornelian cherry and a root like the *ror* [a type of plant] with as many rings as it is years old (this is the watersnake herb that grows in Germany).[102] Who covers himself with dragonwort (says Tarentinus)[103] does not have to worry about the adder.

Different from all of these is the *Dragoncell* (in Latin *dracunculus hortensis*), which is eaten in salad. It is also used to prepare sauces and gravy, tastes very pungent, and its leaves are long and narrow; it creeps with the roots on the ground like grass. Many believe that this herb does not grow on its own in nature but is made to grow through skill just as flax seeds are placed into hollowed onions and then planted like that. Many have tried it that way but they were not successful; therefore I do not believe it to be the truth.

In the dragon's head one can find a stone called dragon stone. But this one should be found in them when they are killed on purpose and then one cuts out the stone afterward. When the dragon perishes in a different way the stone melts away and disappears in its brain. For that reason they are pursued, their caves carefully watched; one throws them herbs and other medicines that induce sleep and so when they are fast asleep they will cut out the stone without much hesitation. This stone is supposed to be well regarded and valued by the kings of the Orient, with beautiful and lovely colors and notable virtues

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and powers. It is so hard that it cannot be artificially polished or cut. Therefore its brilliance, color, and beauty are natural and unmarred by handiwork.[104]

All famous physicians know a sickness called tragunculus. But since it occurs only among inhabitants of Arabia and Egypt and is unknown in our regions we will not describe it here.

Since olden times the old have pictured dragons in their flags and banners. That is why flag bearers are called dragon carriers. Look at Claudianus with which pomp and display the emperor Constantine supposedly had such dragons carried ahead of himself.[105] If it did not show the name of the emperor or the mayor a dragon was painted [on the flag].

On the island Delos[106] the idol Apollo was worshipped in the shape of a dragon.[107]

The Phoenicians, when they wanted to paint and picture their idol Janum, asked for a dragon to be painted, which was pictured bent around, gnawing at its own tail to show that the world sustains itself and is influenced by the course of the heavens.[108]

The Egyptians also worshipped the sun and moon under the idol Mercury's staff, which was decorated with two entwined snakes. This staff signifies that for the birth of humans, these dragons—that is, the sun and moon—were helpful. While the dragon was compared to those two planets and their strength attributed to it, a dragon was always shown and painted in the picture of Aesculapius, to demonstrate that as the dragon gains youth every year by shedding the skin, so the human repeats himself and every year becomes strengthened and refreshed through the power of the sun. Also, there is between the sun and the dragon this comparison: that at certain times it will come closer to us and other times its course will rise and, so to speak, the dragon becomes younger again.[109]

The idol Minerva is often pictured with a night owl and a dragon. For that reason the well spoken man Demosthenes, as he left the land, is supposed to have said: The goddess Minerva—which to him embodied his home town, Athens—entertained herself in the meantime with three gruesome wild animals and had them for pleasure, joy, and entertainment: the dragon, the owl, and the buffalo.[110]

The excellent sculptor Phydias used to add a dragon to a depiction of Minerva and with that secretly indicate and make understood that

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virgins should be kept and honored, so their breeding and chastity would not be stained. About this depiction of how to protect young maidens the widely known Alciatus wrote this lovely poem:

> Here stands painted the goddess Pallas,
> Who always remains a pure virgin,
> Her protection and coverage provided by a dragon,
> An attentive animal. With this is indicated nicely
> That virgins should never be left alone,
> But with care protected,
> Because the little Cupid
> Exercises his tricks in many ways.[111]

The interpreters of the stars call the points where the moon takes its track across and over the sun's course a dragon. The upper part is called the dragon head, the bottom part the dragon tail.[112]

Petrus Damianus[113] writes about a farmer who started his work early in the day one time, but then became tired. An immensely large dragon lay ahead of him, which he took to be a rock and sat on it, which angered the dragon, and it swallowed the farmer.

Pausanias reports of Ophelte (who was King Lycurgus's son) that when the wet nurse had first laid him down in the grass near the temple of Jupiter in Nemea, he was killed by a dragon.[114]

Caelius[115] writes that after the Greeks had apparently left Troy, the traitor Simon was forgiven and taken in by the king, and that two dragons from the island Tenedos swam across the sea and strangled Laocoön together with his sons because they had stabbed the wooden horse. Vergil says in the second book that both dragons fled after the murder.

> There in Minerva's temple
> Where both were hiding
> Under her shield and feet,
> The goddess allowed them under there.
> There was a big scare for all of us
> So that everyone was wondering in his thoughts
> How he might have been guilty of it
> When he stabbed the horse, etc.[116]

In the very beginning when the Swiss countryside was first settled and cleaned, a terrible dragon was found there that chased away people and animals near the village of Wyler (that is why the village is now called Oedwyler [Empty Wyler]). And a countryman (named

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Winckelriedt) who had been banned from the country due to manslaughter was gladly assured that he would be shown mercy and allowed back should he succeed in killing the dragon. However, after he beat the dragon he immediately and triumphantly raised his arm, in which he held the bloody sword, celebrating victory, which caused dragon blood to contaminate his body, of which he died, as Johann Stumpff shows in his chronicle.[117]

During the times of King Philip a mountain road in Armenia (now called Turcomania) was so poisoned and dangerous that nobody who came across this mountain survived staying on that place. When King Philip now asked what the reason was for that, Socrates installed a mirror against the mountain and showed (as Aristotle indicates)[118] in it two large dragons with their mouths wide open and with their poisonous steam and breath polluting the air. Therefore, the king ordered that men should be sent there who should kill and strangle the dragons. And so this road was carefully cleaned up, so that afterward one could safely hike across the mountain.

Olaus Magnus writes: The Bishop named Sanctus Donatus is supposed to have spat into a dragon's mouth and thus killed it, which had been so large that eight pairs of oxen could hardly pull it to the fire. This same dragon is said to have lain near a bridge along a road and swallowed goats, oxen, horses, people, and whatever else it could get.[119]

The poets write a lot about their idols and also of people and how they were transformed into other shapes. Not that they considered their fables as fables themselves but to admonish unchastity, excess, and lust they introduce the transformation into dragons and other such animals to scare people, so that out of fear of such an ending they improve their ways. And the idol Jupiter's lewdness, excess, and unchastity also indicates this fable: that he was transformed into a bull so that he wrongfully deceived Ceres. Just as when he begat a daughter called *Persephone* or *Proserpina*, who grew up and became beautiful, he is supposed to have transformed into a dragon and in this terrifying shape slept with her as well. And from him she conceived a son who was shaped like a bull. From this the poets wrote the poem of how a bull was the father of a dragon and in turn a dragon was the father of a bull. In the second Book of Moses in the seventh chapter it states that Aaron's staff, when he threw it, ordered by God, onto Earth, turned into a snake.

Ovid writes of Cadmus that under order of his idol he was to watch a cow and where it was to lie down to build a town at that location.

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He followed the order and found a cow (as predicted) in the country that is named Boeotia after the cow. As he now sent his comrades to a well for water they were all strangled and killed by a dragon that had its home nearby. Therefore, he went to the well himself, and when he found his friends lying there miserably he killed the dragon. Pallas the idol gave him this advice: to sow the dragon's teeth. He did, and from those teeth grew well equipped warriors (because warriors are mostly raw, cruel, and bloody as the dragon's teeth), who stabbed and struck each other, leaving only five in the end, who made peace and helped Cadmus build the town of Thebes.[120]

Also, he reports of Jason traveling to the island of Colchis for the golden fleece, and with help of magic from Medea (who was the King's daughter) he overcame and defeated the fire-spewing oxen, the giants, and the dragon.[121]

The poets describe the dragons as guardians of the golden fleece and the gardens of Hesperides, in which golden apples are said to grow, so they would be protected by them (meaning the big danger that money and goods bring with them). Of this dragon Ovid writes in his seventh book, in which he knows and shows the manner in which Jason falls asleep and captures the golden fleece, and says:

> Jason had to face the large dragon,
> Fight and defeat it.
> It had sharp teeth and pointy claws.
> Its fierceness inspired terror.
> Its shape induced terror.
> It had a three-pointed tongue.
> Its body was large and stout.
> It guarded the tree of the golden apple
> As also the golden fleece's goods.
> Jason poured juice over the dragon
> From an herb the large powers of which
> Served wonders at this place,
> In addition to many blessings he did
> From which the dragon died
> And let Jason run to the golden apples
> And harvest as many as he wanted
> And also take the fleece of gold, etc.[122]

Diodorus Siculus[123] tells this fable in this fashion: When Aeëtes reigned in Pontus it was predicted that he would have to die when for-

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eign guests would come across the sea and take away the golden fleece. Now when the king (who already was a terrible tyrant) heard of this he ordered all strangers who arrived to be killed and sacrificed so as to warn off and deter all others with these terrible deeds. In addition he had a wall built around the temple and ordered guards to guard the fleece. Of these guards the Greek have rhymed curious fables such as of strong oxen that spewed fire, as well as a dragon who took care of the golden sheepskin (or *uellus*, called fleece for short), and compared the guards' strength with the oxen and the king's cruelty with spewing fire. The dragon, however, they saw as guardian, due to its admirable, attentive manner and nature. Similar fantasies have been fabricated and brought forth about the garden Hesperides. However, the dragon signifies nothing but our lust and wants. And since Hercules, who is said to have fought it with his club and arrows and strangled it, is said to have won and received three golden apples, they demonstrate that through overcoming his desires he achieved three things such as mastering his rage, abandoning his greediness well, and overcoming his lust.[124]

We showed above that often miracles and miraculous signs happen through dragons and snakes, and major occurrences are signified and demonstrated through them. Mamaea, the mother of Emperor Alexander Severus, dreamed the day before the Emperor's birth that she would bear a small dragon.[125] So were predicted and revealed for Alexander and Publius Scipio Africanus their magnificence, force, and power through the appearance of a dragon.[126] Through a dragon it was also foretold that Augustus would reach power and become emperor, because as his mother Atia visited the temple of idol Apollo at midnight and fell asleep in her sedan-chair (in which she let herself be carried to the temple), a dragon sneaked up to her and lay with her but disappeared again soon after. But when she awoke she saw on her body the picture of a dragon that she could not get rid of. From then on she no longer could go to a public bath.[127]

The Emperor Tiberius used to entertain himself with a dragon that he had raised and that he himself fed, and when the ants devoured and gnawed the dragon he was warned to be cautious and guard himself against the power of the masses.[128]

Dragons have shown themselves to their victims and often brought them lots of luck and good tidings, but they often predicted hardship and the coming end to many others.

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One can read in old Roman chronicles about dragons and how large those are that have been seen and brought there, because as often as the Tiber flooded, many snakes and dragons were gathered all the way to Rome. Especially during the times of Emperor Mauricius[129] this miracle is said to have happened. At that time when the Tiber flooded and flowed out of its bed many different kinds of snakes appeared, and among them one saw a terribly large dragon going down the middle of the stream, which was followed by many deaths across the region.[130]

In 1499, on the twenty-sixth of May, a dragon was seen in Lucerne swimming down the Reuss from the lake, which was seen by many people who were puzzled by it.[131]

Dragons have also often been sighted in German regions gliding through the air in sunlight. First near Niderburg (not far from St. Goar on the Rhine) the inhabitants there saw in three different summers during the bright daylight a dragon in the air as if it was hanging there and shaking its tail.[132] After that the town burnt for the third time, and the accident was so serious that nobody could fight the blaze and douse the fire. Almost at the same time, not far from the burned town several dragons were seen, which bathed and washed there in a well. From that the water was so poisoned that people and animals who happened to drink from it immediately swelled and died. Once that became known, it was realized that the poisoned and dangerous well needed to be filled in so that others would not be endangered unwittingly.[133]

Suetonius writes: Nero was kept alive for a period of time by a dragon. Then, when several people—through urging by Messalina, Claudius's widow—were ordered to strangle and kill him, a dragon who supposedly lay under Nero's pillow scared them and chased them away.[134]

Many of the ancients revered dragons as gods and prayed to them, which also the Holy Scripture supports in the story of Bel. Those from Babel prayed to a large dragon, into which Daniel, with the king's permission, thrust a cake made of pitch, fat, and hairballs into its mouth and exploded it.

The Epidaurian dragons belonging to Aesculapius and raised at great expense, we mentioned above. Lucian writes of a magician who fed a dragon and claimed to people that he was Aesculapius and therefore monkeyed [tricked] them with his idol and misled them.[135]

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The Egyptians worshipped for a time (as Aelianus writes) a dragon that had been given with its own tower and priests, who gave it food and other necessities. Its servants used to prepare a table and every day would serve cake or flatbreads made from flour and meat placed into a dish, and then leave again. The following day they would not find anything left in the dish. When one of them was curious and wished to see the dragon, he entered by himself, and as soon as he prepared and served the food he left the tower again, waited until it would come forth to eat, and then quickly and forcefully opened the door and saw the dragon, which, enraged, had backed away. Soon thereafter the servant lost his senses, professed his misdeed first, then suddenly became mute, fell down, and died.[136]

Near Lavinium in a banned forest close to the temple of idol Juno was a dragon that was revered by the maidens, who fed him with their own hands, from which they received information about many secrets in return; especially, though, he supposedly attested about their virtue and virginity.[137]

In Epirus was a blessed township (as indicated by Volaterranus)[138] enclosed by walls and inhabited by dragons. The inhabitants worshipped them and ordered naked virgins to feed them. If they behaved in a friendly manner and finished the meals, a fertile and good year was supposed to follow; in contrast, bad years were expected if they were angry and refused all food.

The Greeks had a common saying that no dragon will emerge from a snake unless it devoured many snakes previously. This means that none could become a powerful king and a great man without swallowing many other men and bringing them under his power, in agreement with our saying that greatness requires much and much finds room in greatness.

Andrea Alciatus also showed, at the end of his verses, in the picture of a dragon that swallows the sparrow's young under the title, that great important deeds lead to eternal praise, and says:

> A work supposed to endure many years
> Requires lots of time and effort,
> As Calchas reports to his Greeks
> Who test him against a dragon
> That ate a sparrow and its young
> Nesting in a maple.[139]

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About the Large Dragon Called Python

The poets write about this dragon Python which, after the Great Flood of Deucalion, rose from the leftover moisture and was supposedly killed by Apollo. Ovid writes about this dragon. He says there:

> There grew the monster Python,
> Unknown to the new population.
> It brought great danger to the people
> And was killed by Phoebus.
> They armed themselves with great haste
> For the fight with bow and with arrow.
> He shot many arrows
> Before he hit the worm.
> But with that this story
> Will not be forgotten over time.
> He arranged for a fight
> To be held without grudge.
> This game was called Pythia
> To remind of Python the serpent.
> A large number gathered
> Of young people everywhere.
> Many tears sprang for Phoebus,
> Many raced, fought, and wrestled,
> And the one who won the fight
> Received a beautiful wreath.[140]

Others interpret this fable in such a way: that Latona was impregnated by the idol Jupiter and for this reason was hated by Juno and chased everywhere, until in the end she arrived on the island of Delos and there gave birth to Apollo. When Apollo came of age he supposedly killed a wicked person named Dragon with a bow.[141] Calepinus[142] assumes that this dragon called Python, which was subdued by Phoebus, indicates the birth of worms and dragons, because πυθων [*pythōn*] stems from moisture and decomposition and indicates, therefore, that the dragon stems from the moisture and wetness of the earth and is overpowered by Phoebus, which is the sun (which through its heat diminishes all remaining moisture). Because of this deed Apollo is called Pythius. And because of that the altar and temple built in honor of the idol Apollo on the island of Delos were named Pythia and Delia. Just as the name Pythia was given to the virgins or the idol's priestesses, so were also all those names thus who had the spirit of prophecy, who

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brought their masters much gain with their predictions. The Greeks and Romans have many sayings about the games called Pythia based on it, but which are not common in our language.

About Flying Snakes, Which the Common People Also Call Dragons

In many places in India one can find snakes (as Megasthenes indicates) that have wings like bats and fly by night and cause damage. Those who touch the dripping urine that they drop become putrid and often their member rots off.[143]

In the mountains that separate the kingdom of Narsinga from the peoples of Malabar, besides many other wild animals there are many flying snakes that sit on the trees, that kill and poison those who come near just by panting and glancing at them.[144]

In the spring of every year from Arabia and the land of the Moors in Egypt arrive winged snakes in large numbers that poison the country and cause much damage except where the birds called ibises meet them at the borders and chase them away, for due to a special instinct these birds attack them in the air and strangle them.[145]

Belon[146] writes that he himself saw many that had feet and were dried out, the drawing of which is shown here [see figure 2B].

While such animals are unknown in France, during the reign of King Francis, not far from Rochelle, such a flying snake was killed and beaten with a spade by a farmer toward whom it was flying and afterward taken to the king and was shown to him. And there it was seen by many trustworthy and learned people who supposed that it had been thrown across the ocean by windstorms and thus arrived.[147]

The large snakes that stay by the Pyrenees are also supposed to have true wings.[148]

A bookseller from Steyrmarck once told to Mr. Froschowern[149] that in the forty-third year of the current century[150] near the Steyrmarck many flying, four-legged snakes, especially poisonous and similar to lizards, were once seen.[151]

Cardanus writes: he has seen in Paris five dried-out flying snakes that were found at different times but were similar in shape. They had two feet and such small wings (he says) that in his estimation they would have barely been able to fly and become airborne with them. The heads were small and formed like snake heads, light in color, without feathers or hairs, the largest of which was as large as a rabbit.

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No human could have created or cut these figures or bodies so identically. In addition, one would have given them larger wings without a doubt, so that the figure would cause less suspicion.[152]

Appendix 2: Annotated English Translation of Ibn Sīnā's *Al-Qānūn Fī Al-Tibb* (*The Canon of Medicine*) 4.6.3, the Dragon Section

This is translated from A.U.B. Libraries (2007) by Eid E. Haddad, with annotations and minor editing by Phil Senter. Notes in square brackets are explanations by us and are not in the original document.

Chapter on Other Snake Categories, Whose Bite Hurts and Causes Wounds Without Venom; Which are the Very Big Snakes Such as the Tinnīn

It is said that the length of the smallest of the *tinnīn* species, as some have stated, is five cubits, and upward of thirty cubits for big ones. It is said that the *tinnīn* has two big eyes, and a chin-like protrusion under the lower jaw.[153] They have large fangs.[154] People have said that they live and reproduce in the region of Nubia[155] and India, that the Indian one is larger,[156] and that the Greek one that lives in the land of Asiya[157] [Egypt] is four cubits long. But the Indian one is said to be the largest, as people have said and as we stated; they have yellow and black faces,[158] mouths of huge capacity, eyebrows covering their eyes,[159] scaly necks, and in each jaw are three fangs.[160] I say, we have seen them like that with thick hair on both edges of the neck.[161] It is said that the tear from their bite causes moderate pain, then inflammation, and the bite of the male is worse than that of the female. I say that it is true that lands other than the land of India may have gigantic dragons. It is said of the treatment that it is similar to the treatment for a bad ulcer.

Chapter on Agathnimon and Alsier[162]

Both are thought to belong to the *tinnīn* category. It is said that someone with a bite wound from the *agathnimon* displays symptoms typical of those bitten by *tinnīns*. But the *alsier* is said to have strong fangs and that its bite tears and dries the flesh, thus exaggerating the

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tear and the laceration, and is in need of treatment similar to those of very severe injuries or cuts.

Chapter on Bites of Marine Tinnīn

It is said that the area of their bites should be covered with a mixture of sulfur and vinegar; it is said that it may benefit from bandages made of alligator grease and the mullet fish and lead when rubbed over the bite area. Other treatments are as mentioned in the chapter on *alratealla*.[163]

Chapter on Two Marine Animals

These are mentioned by some scientists, and I think they belong to the category of marine *tinnīn*. One of them is the *smoraa*.

Chapter on Smoraa[164]

It is claimed by a scientist[165] that its bite wound makes the bitten one display symptoms similar to those exhibited by snake bite wounds, and its treatment may be similar to treatment of those by the other serpent.[166]

Chapter on Trogorn[167]

It is said of the *trogorn* that the wound causes severe pain, severe chills, numbness, and imminent death. Its therapy is similar to that for coldness-causing poisons. It is said that warm vinegar should be spread over the wound, and the bite area wrapped with bay leaves and spread over with costus oil and pyrethrum oil or similar oils or those that have the powers of squill[168] and nettle.

Of Potions for Treatment of Their Bites

Boiled bay leaves with lovage,[169] vinegar, and rue. Or pepper, rue, and myrrh mixed in equal amounts, taken as *drakhmi*.[170] The potion with the first antidote is described in the chapter on *alratealla*.[171]

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Notes

1. We have not determined whether the Latin version or the German version was written first, nor are we certain who did the translating from one version to the other.

2. For this and several other references (Bostock 1855; Meineke 1877; Bekker 1890; Magnus 1892; Greenough 1900; Anonymous 1903; Ihm 1907; Evelyn-White 1914; Frazer 1921; Rolfe 1927, 1940) we used transcripts posted online in the Perseus Digital Library (Crane 2013).

3. We used Migne's (1864) Latin and Greek transcripts of *On Dragons* by John of Damascus.

4. Here, Gessner actually uses the German word *Track*.

5. Macrobius Ambrosius Theodosius (fifth century), *Saturnalia* 1.20.3 (Jan 1852). *Saturnalia* is a collection of Roman lore.

6. Augustine of Hippo (354–430), *On Psalm 148*: 7 (Coxe 1886). No previous work claims that dragons are the world's largest animals.

7. Of the two, Gessner appears only to have consulted Albertus Magnus (c. 1200–1280, *De Animalibus* 25) (Kitchell and Resnick 1999), whose Latinized terms differ greatly from the original Arabic of Ibn Sīnā ("Avicenna": Abū 'Alī al-Ḥusayn ibn 'Abd Allāh ibn Sīnā, 980–1037, *Canon of Medicine* 4.6.3) (A.U.B. 2007). The *Canon* was disseminated in many languages, so Albertus's Latinized terms may be derived from some language other than Arabic. Ibn Sīnā classes four animals within the *dragon* (*tinnīn*) category: the *agathnimon*, *alsier*, *smoraa*, and *trogorn*, of which the latter two are marine (*Canon* 4.6.3). Albertus appears to omit the *agathnimon* or *alsier* and renders the other three animals' names as *ahedysymon*, *alhartraf*, and *haudyon*. It is difficult to identify these animals with certainty. Albertus repeats Ibn Sīnā's list of *trogorn* bite symptoms and ascribes the bite symptoms to both the *alhartraf* and *haudyon*. Kitchell and Resnick (1999, p. 1719) identify Albertus's *alhartraf* and *haudyon* as the lamprey, whereas the A.U.B. translators respectively identify the *smoraa* and *trogorn* as the moray eel and the stringray (2007). Plausibly, these terms are cognates of the Greek *smyros* and *trygon*, with

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which Aristotle respectively refers to the moray and the stingray in *History of Animals* (Cresswell 1902). We therefore postulate the following: Albertus's *draco* = Ibn Sīnā's *tinnīn*; Albertus's *ahedysymon* = Ibn Sīnā's *agathnimon* or *alsier*; Albertus's *alhartraf* and *haudyon* = Ibn Sīnā's *smoraa* and *trogorn* = Aristotle's *smyros* and *trygon* = moray and stingray.

8. Claudius Aelianus (c. 175–235), *On the Characteristics of Animals* 2.21 (Scholfield 1958). Here and elsewhere, Gessner's "land of the Moors" is not the Maghreb but is Africa south of Egypt.

9. Aelianus, *On the Characteristics of Animals* 16.39 (Scholfield 1958), one of many apocryphal stories of Alexander and immense Indian snakes, probably inspired by Indian rock pythons (*Python molurus*). Aelianus actually says 140 and 80 cubits, not 46 and 80.

10. Aelianus, *On the Characteristics of Animals* 16.39 (Scholfield 1958). The only African snake this large is the African rock python (*Python sebae*).

11. Chios is a Greek island near the west coast of present-day Turkey.

12. Greek: συριγμόν (*syrigmon*), which can mean hissing or whistling but here refers to serpentine hissing. In *Schlangenbuch* it is rendered *pfeyffen* (blowing or whistling). Here and in subsequent paragraphs, we have rendered it as "hissing."

13. Aelianus, *On the Characteristics of Animals* 16.39 (Scholfield 1958). This story may be based on a fossil find.

14. Aelianus, *On the Characteristics of Animals* 15.21 (Scholfield 1958), another apocryphal story.

15. See note 12.

16. Cassius Maximus (second century), *Dissertation 38* (Taylor 1804). According to the story, the Indians kept the dragon in a cave and fed it sheep and oxen.

17. Gaius Julius Solinus (third century), *De mirabilibus mundi* 30.12 (Latin Library 2012). Some of Solinus's dragon description is partly derived from Pliny the Elder, but this tidbit is Solinus's own.

18. Gaius Plinius Secundus (Pliny the Elder, 23–79), *Naturalis historia* 8.13 (Bostock 1855). Pliny's is the earliest prose work of natural history to include a detailed entry on the dragon.

19. The Latin version cites Nikephoros Kallistos Xanthopoulos (fourteenth century), writer of *Historia ecclesiastica*. We have not been able to locate a copy of the work for verification.

20. Pliny, *Naturalis historia* 8.13 (Bostock 1855). See note 18.

21. Vincent of Beauvais (c. 1190–c. 1264), *Speculum naturae* 29 (Vencentius 1964); probably based on Jeremiah 51:37.

22. Al-Hasan ibn Muhammad al-Wazzan al-Fasi (c. 1494–c. 1554), *History and Description of Africa* 3.9 (Pory 1600). Al-Fasi says the Atlas "dragons" are venomous and therefore differs from others in applying the term *dragon* to a venomous snake. His description (venomous, thick midsection, narrow neck and tail) matches the large, Moroccan vipers of the genus *Macrovipera*.

23. This is not in Johann Stumpff's (1500–c. 1578) *Schwytzer chronica* (1544), a short version of Stumpff's 1548 work *Gemeiner loblicher Eydgnoschafft Stetten, Landen und Voelckeren Chronick wirdiger thaaten Beschreybung*. It may be in the longer work, which we have not been able to locate for verification.

24. Strabo (64/63 BC–AD 24), *Geography* 15.1.73 (Meineke 1877). An ambassador from India brought Octavianus a five-cubit serpent, among other gifts.

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25. Ibn Sīnā, *Canon of Medicine* 4.6.3 (A.U.B. Libraries 2007), in a paragraph on non-marine dragons (*tinnīn*) that conflates Pliny's pythons, Nikandros's Aesculapian snake (from which Ibn Sīnā's assertion that the dragon has a black and yellow face is arguably derived), and Philostratus's conflations of other conflations (see note 29).

26. Here and below, this refers to a coxcomb.

27. Lucius Flavius Philostratus (c. 171–c. 248), *Life of Apollonius of Tyana* 3.6 (Conybeare 1912), generally thought to be a largely fictitious account.

28. Homer (ninth century BC?), *Iliad* 2.308 (Monro and Allen 1920). This is the earliest surviving written work with a cognate of "dragon."

29. This is a misunderstanding of Philostratus (*Life of Apollonius of Tyana* 3.7) (Conybeare 1912), in which Philostratus says that the teeth of dragons are like those of the largest swine, but slenderer and more flexible.

30. Philostratus, *Life of Apollonius of Tyana* 3.6–7 (Conybeare 1912), a short passage that is a singular comedy of errors of mistranslation, conflation, and amalgamation of various sources. The attempt to separate dragons into a crestless lowland kind and a crested and bearded mountain kind is a naive attempt to treat descriptions in mythic poetry as if they are descriptions in natural history literature. The mountain dragons are based largely on the dragons that attack Laocoön and his sons in Vergil's *Aeneid* (2.200–230) (Greenough 1900). Vergil's dragons hold their necks high, swim fast across the sea (which Philostratus mistranslates as a river), have red crests, have eyes that shine like fire (which Philostratus mistranslates as crests that shine like fire), and their backs are folded into sinuous curves, which Philostratus mistranslates as their having serrated backs. Philostratus's dragons' overhanging eyebrows are a corruption of Nikandros's poetic statement that the dragon's eyes gleam beneath its brows (*Theriaca* 443 [Gow and Scholfield 1953]). Philostratus's bushy and golden-colored dragon beards blend Nikandros's (*Theriaca* 444) reference to the dragon's "beard" of yellow color—which identifies Nikandros's dragon as *Zamenis longissimus* (the Aesculapian snake)—with Aelian's statement that the bushy beards of baboons resemble dragon beards (*On the Characteristics of Animals* 10.25 [Scholfield 1958]), itself probably a corruption of Nikandros. Philostratus's insistence on crests and beards in dragons may also have been encouraged by the fact that snakes with rooster combs and wattles are common in Greco-Roman art.

31. Augustine, *On Psalm 148*: 7 (Coxe 1886). Augustine's passage is the earliest to assert that flight is a property of real dragons, as opposed to mythical dragons, e.g. Medea's and Triptolemos's dragons, which—like the flying horse Pegasus—were *unusual* in that they flew.

32. Paolo Giovio (1483–1552), *Historiarum sui temporis* 18 (Giovio 1550). Giovio's passage is actually not on Georgia but is on a region of sub-Saharan Africa that Giovio calls Gog. His passage echoes Pliny's (*Naturalis historia* 11.112) inexplicable statement that some snakes have feet like geese.

33. Pausanias (c. 110–180), *Description of Greece* 2.28.1 (Anonymous 1903). The yellowish Epidaurian dragon is most likely *Zamenis longissima* (Aesculapian snake), in which the color varies but is yellowish-olive in lighter-colored individuals (Valakos et al. 2008).

34. Lucian (125–180), *Alexander the Quack Prophet* (Casson 1968), a fictional satire that Gessner seems to have mistaken for history.

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35. Ibn Sīnā (*Canon of Medicine* 4.6.3) (A.U.B. Libraries 2007), repeating the problematic description of Philostratus (see note 29).

36. Solinus, *De mirabilibus mundi* 30.12 (Latin Library 2012). Restraining with the tail may be a reference to constriction.

37. We have not identified which of the various authors named Aetius is quoted here.

38. Ibn Sīna (*Canon of Medicine* 4.6.3) (A.U.B. Libraries 2007) mentions the large mouth and fangs of the *tinnīn* (see note 7), but does not mention pigs. The mention of pigs may therefore be from Aetius. The comparison with pigs is probably derived from Philostratus (*Life of Apollonius of Tyana* 3.7) (Conybeare 1912).

39. Solinus (*De mirabilibus mundi* 30.12) (Latin Library 2012) says this, not Nikandros.

40. Pliny, *Naturalis historia* 14.36 (Bostock 1855); Aelian, *On the Characteristics of Animals* 2.21 (Scholfield 1958).

41. Solinus, *De mirabilibus mundi* 30.12 (Latin Library 2012). The split tongue is characteristic of snakes.

42. This statement may be derived from the myth of Talos. According to Apollodorus (c. 180–after 120 BC), Talos is said to have invented the first saw by sawing through a thin piece of wood with a snake's jawbone (*Library* 3.15.6) (Trzaskoma et al. 2004).

43. Pliny, *Naturalis historia* 8.13 (Bostock 1855). Here Pliny expresses surprise that King Juba II of Mauretania believed that dragons were crested.

44. Philostratus, *Life of Apollonius of Tyana* 3.7 (Conybeare 1912). See note 29. Gessner's "other trustworthy writers" merely quote Philostratus.

45. See note 12.

46. The Latin version cites *De proprietatibus elementorum*. This work was written not by Aristotle but by an Arabic pseudo-Aristotle (Vermij 1998).

47. Aristotle (384–322 BC), *History of Animals* 9.7.4 (Cresswell 1902); Nikandros, *Theriaca* 451–455 (Gow and Scholfield 1953); Aelianus, *On the Characteristics of Animals* 6.4 (Scholfield 1958).

48. Thomas de Cantimpré (1201–1272), *Liber de natura rerum* 8.16 (de Cantimpré 1973).

49. Aelianus, *On the Characteristics of Animals* 2.21 (Scholfield 1958). No snake from Phrygia (central Turkey) is actually large enough to fit this description.

50. Pliny, *Naturalis historia* 8.13 (Bostock 1855), folklore possibly inspired by cobras' hoods.

51. This is possibly based on Augustine (*On Psalm 148*).

52. This assertion comes from Solinus, *De mirabilibus mundi* 30.12 (Latin Library 2012).

53. Al-Fasi, in *History and Description of Africa* 3.9 (Pory 1600), inexplicably calls a griffin-like creature a dragon.

54. Aristotle, *History of Animals* 9.7.4 (Cresswell 1902), an interesting but scientifically inaccurate belief. No snakes are herbivorous.

55. We have not identified Gessner's source for this statement.

56. Aelianus, *On the Characteristics of Animals* 8.11 (Scholfield 1958).

57. Aelianus, *On the Characteristics of Animals* 6.17 (Scholfield 1958), an apocryphal account, evidently inspired by constriction.

58. See note 12.

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59. Aelianus, *On the Characteristics of Animals* 6.63 (Scholfield 1958).
60. Aelianus, *On the Characteristics of Animals* 10.48 (Scholfield 1958).
61. Aristotle, *History of Animals* 9.2.3 (Cresswell 1902). This, the earliest dragon reference in natural history literature, shows that the Greeks understood the dragon as a type of snake.
62. Aelianus does not say this. We have not identified Gessner's source for this statement.
63. Nikandros, *Theriaca* 446–457. Gessner's translation of *Theriaca* is poor. For a better one see Gow and Scholfield (1953).
64. Petrus Gyllius (Pierre Gilles, 1490–1555). Gyllius (1535) here quotes from Nikandros's *Theriaca*.
65. Homer, *op. cit.* 12.200–205 (Monro and Allen 1920). This, the earliest Greek reference to the *drakōn*, also calls the animal an ὄφις (*ophis*: snake), showing that the Greeks understood the drakōn as a type of snake.
66. Aelianus, *On the Characteristics of Animals* 6.21 (Scholfield 1958), probably a corruption of Pliny's account.
67. Pliny, *Naturalis historia* 11.32, 12.33–34 (Bostock 1855). This passage exaggerates the dragon's size but shows that Pliny understood the draco as a huge, constricting snake of Africa and India, i.e. a python.
68. Peter Damian (c. 1007–1072/3), *Letter 100* 33 (Blum 1998). According to the story, a lion daily brought sailors prey that it had caught, in gratitude to them for having freed it from the coils of a constricting dragon.
69. Anonymous (probably second century), *Physiologus* 30, which actually states that the dragon flees from the leopard, but all the other animals follow the leopard (Curley 2009).
70. Philostratus, *Life of Apollonius of Tyana* 3.8 (Conybeare 1912). This story is reminiscent of what one would expect from a confidence trickster trying to sell an ordinary stone.
71. Marcus Terentius Varro (116–27 BC). We have not identified the work quoted here.
72. Thomas de Cantimpré, *Liber de natura rerum* 8.16 (de Cantimpré 1973).
73. Pliny, *Naturalis historia* 30.39 (Bostock 1855). Pliny lists traditional remedies derived from a variety of animal body parts.
74. Pliny, *Naturalis historia* 32.26 (Bostock 1855), a passage on a marine fish, not a snake.
75. Pliny, *Naturalis historia* 29.38 (Bostock 1855). See note 73.
76. Pliny, *Naturalis historia* 30.24 (Bostock 1855). See note 73.
77. Pliny, *Naturalis historia* 33.38 (Bostock 1855). See note 73.
78. Serapion the Younger (probably twelfth or thirteenth century), *Simplicibus medicinis* 331 (Serapion 1531). He was apparently correct that "dragon blood" was botanically derived.
79. 1487–1548, a German theologian.
80. Pliny, *Naturalis historia* 33.38 (Bostock 1855). See note 73.
81. Dioscorides (AD 40–90), in *On Medicine*.
82. Pliny, in *Naturalis historia*.
83. Theophrastus (c. 371–287 BC), in *History of Plants*.
84. This is incorrect. Porto Santo, in the Madeiras, was not discovered by humans until the fifteenth century and was therefore unknown to Arrian (c. 86–160).

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85. Sante Ardoini, *De venenis* 6.27 (Ardoini 1562). Here, Ardoini quotes Vincent of Beauvais in *Speculum naturae* 29.

86. Here and below, Old Testament dragons are mistranslations. In the Greek Septuagint the Hebrew *tannîyn*—which can mean a jackal or a venomous, mythical sea monster—is translated *drakōn* (a better Greek equivalent for the marine *tannîyn* is *kētos*), and the Vulgate retained this mistranslation in Latin as *draco.* The conflation continued in the Arabic language, with *dragon* as *tinnīn*, which may have influenced Ibn Sīnā's choice to include marine fishes in the *tinnīn* category (see note 7).

87. Marcus Annaeus Lucanus (AD 39–65), *Bellum Civile* 9.727–729 (Latin Library 2012), a metaphor, not meant literally.

88. Al-Fasi, *History and Description of Africa* 3.9 (Pory 1600). See note 22.

89. Aelianus, *On the Characteristics of Animals* 6.4 (Scholfield 1958), relating an ancient Greek explanation for snakes' toxic bites.

90. Solinus, *De mirabilibus mundi* 30.12 (Latin Library 2012). The tail of an African rock python is indeed prehensile and strong.

91. Gessner's Latin version lists the reference as Aetius, but we haven't identified which of various authors named Aetius this is.

92. Ibn Sīnā, *Canon of Medicine* 4.6.3 (A.U.B. Libraries 2007), on the *tinnīn* (see note 7).

93. This may refer to Pliny's (*Naturalis historia* 22.58) (Bostock 1855) statement that barley meal and vinegar alleviates snakebite.

94. Dioscorides makes this claim in *On Medicine* 2.24 (Osbaldeston 2000).

95. Ferdinando Ponzetti (1444–1527), *Libellus de venenis* 3.3 (Ponzetti 1521), a work on venoms.

96. See note 7.

97. Ibn Sīnā says this of the *agathnimon* (see note 7).

98. Ibn Sīnā says this of the marine *trogorn* (see note 7).

99. Actually Micah.

100. The Old Testament formula *tannîyn* and *ya'en* (Job 30:29, Isaiah 34:13, 43:20; Micah 1:8), which refers to places so desolate that the only sound is the howling of jackals (*tannîyn*) and owls (*ya'en*), is often mistranslated "dragons and ostriches."

101. Dioscorides says this in *On Medicine* 2.196 (Osbaldeston 2000).

102. We did not find Pliny's reference to this.

103. We have not identified this author.

104. This paragraph mixes statements from Pliny (*Naturalis historia* 37.57) (Bostock 1855) and Solinus (*De mirabilibus mundi* 30.12) (Latin Library 2012).

105. Claudius Claudianus (370–404) actually wrote this about the general Flavius Stilicho (359–408), who served under emperors Theodosius I and Honorius, in *Against Rufinus* 2.171–177 and *The Third Consulship of Honorius* 135–141 (Hawkins 1817).

106. Delos is a small Greek island near the larger island of Andros in the Aegean Sea.

107. Gessner's Latin version cites Alexander of Alexandria for this statement, but we have not identified the cited work.

108. Macrobius, *Saturnalia* 1.9.12 (Jan 1852). See note 5.

109. Macrobius, *Saturnalia* 1.20.1–3 (Jan 1852). See note 5.

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110. Gessner's Latin version cites Lilius Gr. Gyral for this statement. We have not identified that author.

111. This is poem 22 of Andrea Alciato's (1492–1550) *Emblemata* (Alciato 1550).

112. We have not identified Gessner's source for these statements.

113. Peter Damian (1007–1072/3). We have not identified the cited work.

114. Pausanias, *Description of Greece* 2.15.2 (Anonymous 1903), a work full of lore from various areas in Greece.

115. Possibly Caelius Rhodiginus (Lodovico Ricchieri, 1469–1525), author of a commentary on Vergil. The strangulation is a reference to constriction.

116. Publius Virgilius Maro (70–19 BC), *Aeneid* 2.199–267 (Greenough 1900). Gessner's translation is extremely abbreviated.

117. Actually from an older work by Petermann Etterlin (d. 1509), *Kronika der loblichen eydtgenossenschaft* (Etterlin 1764).

118. Actually an Arabic pseudo-Aristotle (see note 46).

119. Olof Månsson (1490–1557), *Historia gentibus septentrionalibus* 21.44 (Månsson 1562). The motif in which oxen have difficulty dragging a dragon is present also in British dragon lore (Westwood 1985).

120. Publius Ovidus Naso (43 BC–AD 17/18) records this myth in *Metamorphoses* 3.1–128 (Magnus 1892).

121. Ovidus records this in *Metamorphoses* 7.1–158 (Magnus 1892).

122. An extreme abridgement of Ovidus, *Metamorphoses* 7.1–158 (Magnus 1892).

123. Diodorus Siculus (first century BC) records this myth in *Historical Library* 4.47.1–3 (Bekker 1890).

124. Herodorus (late fifth–early fourth century BC), *On Herakles* 14 (Trzaskoma et al. 2004), explaining the myth allegorically.

125. We have not identified Gessner's source for this statement.

126. Aulus Gellius (c. 125–after 180), *Attic Nights* 6.1 (Rolfe 1927), a work on such disparate subjects as grammar, philosophy, and history.

127. Gaius Suetonius Tranquillus (69–after 122), *De vita caesarum: Augustus* 92 (Ihm 1907). Greco-Roman heads of state commonly accrued dragon legends.

128. Suetonius, *De vita caesarum: Tiberius* 72 (Ihm 1907). See note 127.

129. Flavius Mauricius Tiberius Augustus, Byzantine Emperor 582–602.

130. Pietro Crinito (1475–1507), *De honesta disciplina* 20 (Crinito 1543). It is unclear where Crinito got this information.

131. Etterlin, *Kronika der loblichen eydtgenossenschaft* (Etterlin 1764). Etterlin says that as it swam under a bridge, people saw that the dragon was shaped like a comet with the head of an ox.

132. Possibly a comet. Albertus (*De animalibus* 25) says meteors were also commonly called dragons (Kitchell and Resnick 1999).

133. The Latin version lists the source as "Iustinus Goblerus ad Gesnerum," which suggests personal correspondence to Gessner from Justin Göbler (1504–1567). The account is based on an inscription on a stone slab in Vienna, according to which a nearby well had been filled with soil in the thirteenth century to prevent people from being poisoned by a basilisk that had taken up residence within. An investigation by geologist Eduard Suess (1831–1914) located the "basilisk": a lump of sandstone resembling a rooster (Ley 1959). This basilisk was illustrated as a rooster-headed, eight-legged, serpent-tailed monster in sixteenth- and seventeenth-century books (Münster 1550; Aldrovandi 1640).

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134. Suetonius, *De vita caesarum: Nero* 6 (Ihm 1907). See note 127.

135. Lucian, *Alexander the Quack Prophet* (Casson 1968). See note 34.

136. Aelianus, *On the Characteristics of Animals* 11.17 (Scholfield 1958).

137. Aelianus, *On the Characteristics of Animals* 11.16, in which Aelianus says Lavinium when he means Lanuvium (Scholfield 1958).

138. Rafaello Maffei (Raphael Volaterranus, 1451–1522). The source of this paragraph is actually Aelianus, *On the Characteristics of Animals* 11.2 (Scholfield 1958).

139. This is poem 127 in Alciato's *Emblemata* (Alciato 1550).

140. Ovidus, *Metamorphoses* 1.435–455 (Magnus 1892), a poor translation by Gessner.

141. Macrobius, *Saturnalia* 1.15.51 (Jan 1852). See note 5.

142. Ambrogio Calepino (1440–1510), *Lexicon* (Calepino 1530), a work on the meanings and origins of words.

143. Megasthenes (c. 350–290 BC), *Indika* (now lost), quoted in Aelianus, *On the Characteristics of Animals* 16.41 (Scholfield 1958), where it is worded more like, "When they drop urine, when it falls on anyone's skin it becomes putrid and causes sores."

144. Julius Caesar Scaliger (1484–1558), *Exotericarum exercitationum* 183.5 (Scaliger 1607). This may be a corruption of Megasthenes's account.

145. Ammianus Marcellinus (325/330–after 391), *Rerum gestarum* 22.15.25–26 (Rolfe 1940), an elaboration of Herodotus's (c. 484–425 BC) ibises eating Egyptian snakes that have membranous wings (probably cobras) in *Histories*, 2.75, 2.76, 3.107 (Hare 2010).

146. Belon (1588) described taxidermic dragon hoaxes, which were common at the time (Dance 1976; Senter and Wilkins 2013; Senter et al. 2013; Senter and Klein 2014).

147. Jean Brodeau (d. 1565), *Miscellaneorum* 3.1 (Brodeau 1555), possibly describing another taxidermic hoax.

148. Scaliger, *Exotericarum exercitationum* 183.3 (Scaliger 1607). It is unclear where this idea originated.

149. Christoph Froschauer, printer of *Historia animalium*.

150. 1543, as confirmed by the Latin version.

151. In the Latin version, Gessner cites himself as the reference here.

152. Cardano's (1551) description resembles the hoaxes that Belon (1588) describes. Gessner's disbelief that faked dragons could look identical is a naïve underestimation of the talent of taxidermic artisans. Gessner's disbelief also differs from Cardano's report, which expresses the opinion that such specimens were artificially constructed.

153. This appears to be a literalization of Nikandros's statement in *Theriaca* 443–444 (Gow and Scholfield 1953) that the dragon has a yellow beard. Nikandros was referring to a figurative beard of yellow color, but the Greek word πώγων (*pōgōn*) can also refer to a hairy beard, a reptilian dewlap, or a rooster's wattle. As a result, subsequent authors such as Aelian, Philostratus, Ibn Sīnā, and Conrad Gessner mistook Nikandros's statement for a description of a hairy beard or dewlap on the dragon.

154. As shown below, one of Ibn Sīnā's sources is Pliny the Elder. We have demonstrated in our article that Pliny's *draco* is based mainly on Indian and African rock pythons (*Python molurus* and *P. sebae*). These species are nonvenomous, but

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it is correct to say that they have fangs. As Senter has personally observed, the anteriormost several teeth of members of the genus *Python* are relatively as long as the venom-conducting fangs of members of the cobra family, Elapidae.

155. Nubia includes the region around the Nile in southern Egypt and northern Sudan.

156. Pliny, *Naturalis historia* 8.13 (Bostock 1855). The African and Indian rock pythons are both huge, but the verified record length is greater for the African than the Indian species (Villiers 1950; Das 2010).

157. According to Arab tradition, Asiya was the name of the wife of the Egyptian pharaoh during the time of Moses.

158. This is apparently another reference to Nikandros's *Theriaka*, in which Nikandros says (line 438) that the dragon is dark-colored (χύανόν: *chyanon*, which can be interpreted as "black") with a yellow "beard" (lines 443–444).

159. This is based on a literalization of Nikandros's poetic statement that beneath the dragon's brows are gleaming eyes (*Theriaka* line 443). Philostratus (*Life of Apollonius of Tyana* 3.7) (Conybeare 1912) makes the same mistake, claiming that Indian mountain dragons—his description of which is a corruption of Nikandros's dragon description—have eyes that are sunken beneath an overhanging eyebrow-like protrusion. Ibn Sīnā's literalization probably occurred independently, rather than being based on Philostratus's work, because the lack of any mention of crests or red coloration or serrated backs (Philostratus, *Life* 3.6–7) in the *Canon* indicates that Ibn Sīnā did not use Philostratus as a source.

160. This is derived from a misreading of *Theriaka* lines 441–442, in which Nikandros says that the dragon has three rows of teeth. Snakes in general have two upper rows and one lower row of teeth.

161. See note 7.

162. Ibn Sīnā here recognizes two kinds of non-marine dragon. There is no etymological indication that these correspond to Philostratus's mountain dragons and lowland dragons. It is therefore unclear what two types of real animal, if any, correspond to the *agathnimon* and *alsier*.

163. This refers to a pharmacological section of the *Canon*.

164. Apparently the same as Aristotle's σμύρος or μύρος: *smyros* or *myros*, the moray eel (Cresswell 1902).

165. This could also mean "by the world."

166. In effect, the other of the two marine species.

167. Apparently the same as Aristotle's τρυγών, *trygon*: the stingray (Cresswell 1902).

168. Eurasian medicinal plants of the genus *Scilla*.

169. The Eurasian plant *Levisticum officinale*.

170. An old Arabic measure of weight, approximately equivalent to 3.5 g.

171. See note 17.

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